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OF VICTORIA

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OF THE

Field Naturalists' Club of Victoria.

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Hon. Editor: MR. F. G. A. BARNARD.

The Author of each Article is responsible for the facts and opinions recorded.

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ERRATA.

Page 48, line 9—For "*strictula*, Menke, sp." read "*striata*, Sow , sp."
Page 142, line 8.—For "*viridescens*" read "*iridescens*."
Page 187, line 21—For "*Hierochlon*" read "*Hierochloa*."
Page 187, line 18 from bottom—For "*Choretum*" read "*Choretrum*."
Page 244, line 21 from bottom—For "Bogong" read "Hotham."

NOTE TO BINDER.

Bind supplement (list of members, &c., in July *Naturalist*) at end of volume, following page 246.

Vol. XL.—No. 1. May, 1923.

The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria.

Published 10th May, 1923.

Hon. Editor: F. G. A. BARNARD, Esq.

The Author of each article is responsible for the facts and opinions recorded.

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1923.

Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 14th MAY, 1923.

1. Correspondence and Reports.

2. Election of Members.

3. Nominations for Membership.

4. General Business.

   Election of two Auditors.

   Nomination of Office-Bearers, 1923-4.

5. Remarks by Exhibitors relative to their Specimens.

   Ten minutes' adjournment for discussion of Exhibits.

6. Reading of Papers and Discussion thereon.

   1. By Mr. R. Kelly—"Thrips: an Unpopular Insect, treated Popularly."

   [The author will be pleased if members possessing microscopes will bring them to the meeting and assist in a display of specimens illustrating the paper.]

   2. By Mr. C. Hedley (communicated by Mr. C. Oke), entitled—"On a Thalassoid Element in the Australian Molluscan Fauna."

7. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

   Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and *Naturalist*. Brief descriptions should accompany the exhibits for the benefit of fellow-members.

CHANGE OF ADDRESS.

Any Member whose address, as written on the wrapper of the *Naturalist*, is not correct should communicate with the Hon. Sec. *at once*, as it is intended to publish the Members' Roll in the June *Naturalist*. Street numbers are desired in all cases.

The Club year ended with last month. Any subscriptions overdue should be forwarded to the Hon. Treasurer *at once*.

The Victorian Naturalist.

Vol. XL.—No. 1. MAY 10, 1923. No. 473.

FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 9th April, 1923.

The president, Mr. C. Daley, B.A., F.L.S., occupied the chair, and about fifty members and visitors were present.

CORRESPONDENCE.

From Mr. T. G. Sloane, "Moorilla," Young, N.S.W., thanking the Club for his election as a life honorary member in recognition of being one of the foundation members of the Club.

REPORT.

A report of the excursion to Beveridge on Saturday, 24th March, was given by the leader, Mr. F. G. A. Barnard, who stated that the excursion had been well attended, and the excursionists were very much interested in the physiographical features of Beveridge Hill, an extinct volcano with a very fine crater.

ELECTION OF MEMBERS.

On a ballot being taken, Mrs. Shiels, Lisson-grove, Hawthorn, and Mr. J. R. T. Mannix, Botanical Department, University, were duly elected as ordinary members of the Club.

GENERAL BUSINESS.

Mr. F. G. A. Barnard said that a deputation of nature-lovers would wait on the Chief Secretary on Wednesday, 11th April, with regard to further protection being afforded to certain of our native animals and birds, and asked any members interested to make a point of attending.

A letter was read from Mr. T. G. Sloane, of "Moorilla," Young, N.S.W., urging the Club to do what it could towards securing the permanent reservation and exemption from grazing licences of all land above the 4,000 feet level in South-Eastern Australia. This area contains the sources of a number of important rivers, and by its use as grazing areas is gradually being denuded of its timber, and thus rendered less useful as gathering grounds for streams.

Dr. C. S. Sutton supported Mr. Sloane's statements, and suggested that a copy of the letter be forwarded to the Forest League, and that the Club join with the League in any action that may be decided upon.

Mr. C. L. Barrett, C.M.Z.S., asked whether arrangements had been made for enlarging the *Naturalist*.

The hon. editor, Mr. F. G. A. Barnard, called attention to the paragraph at the end of the current number, and said that he hoped members would come to his assistance and forward sufficient notes every month to make up a twenty or twenty-four page journal. He could not guarantee any enlargement on his own account. Messrs. Hardy, Best, Williamson, and others spoke on the desirableness of increasing the size of the *Naturalist.*

PAPERS READ.

1. By Mr. J. Stickland, entitled "Notes on the Protozoa of the Melbourne District."

The author, by means of enlarged drawings, gave a general outline of the classification of the Protozoa, and referred to those forms to be met with in and around Melbourne.

2. By Messrs. J. H. Gatliff and C. J. Gabriel, entitled "Description of a New Marine Bivalve Shell for Victoria."

The authors described a small shell as *Hemidonax Chapmani*, of which, though many single valves had been found from time to time along the ocean beach, San Remo, and in other places, a complete specimen had only recently been found. It was named in honour of Mr. F. Chapman, A.L.S., palæontologist of the National Museum, Melbourne, in recognition of his very great interest in marine conchology.

NATURAL HISTORY NOTES.

Mr. P. R. H. St. John stated that an albino form of the Blue Wren, *Malurus cyaneus*, Ellis, has recently been seen on several occasions in the Footscray Park by the curator, Mr. H. Matthews.

Mr. C. Oke gave an interesting account of the way in which an Argiopid spider, *Araneus capitalis*, L. Koch, spins its web. This is done by the female soon after sunset each evening, and is removed before daybreak.

EXHIBITS.

By Mr. Chas. Barrett.—Land shells, *Helix bipartita*, Ferussac, collected by Mr. Sidney W. Jackson at Tinaroo, Barron River, Cairns district, North Queensland; and *Helicella separata* (introduced), found in great numbers under stones, in tea-tree scrub, between Middle Brighton and Brighton Beach.

By Mrs. Coleman.—*Thelymitra venosa*, collected on Mount Bogong by Mr. A. G. Hooke, 10/2/23, growing in a wedge of sphagnum moss, a little soil being added to fill the pot. (Other specimens collected from Mount Buffalo in January and planted in soil only have sent up rather less vigorous shoots.)

By Messrs. J. H. Gatliff and C. J. Gabriel.—New Victorian

marine shell, *Hemidonax Chapmani*, Gatliff and Gabriel, in illustration of paper.

By Mr. L. Hodgson.—Flowers of *Leptospermum scoparium*, var. *grandiflorum rosea*, a rare variety, grown at Bayswater from seed found in New South Wales about five years ago (first recorded in 1817 from seed sent to England).

By Mr. A. L. Scott.—Striated pebbles and glacial conglomerate, both from Werribee Gorge, Bacchus Marsh.

By Mr. J. Stickland.—Drawings of various forms of Protozoa, in illustration of his paper.

After the usual conversazione the meeting terminated.

EXCURSION TO BEVERIDGE.

FEW, if any, of the many hundreds who pass Beveridge in the Sydney express and other trains every day have any idea of the interest attached to that comparatively low, hollow-backed hill to be seen about three-quarters of a mile to the west of the station. Saturday, 24th March, was not an ideal day for our excursion, but I think all who went were well satisfied with the outing. Beveridge Hill, as I prefer to call it, is officially known as Mount Bland, having been named by Hume and Hovell on that memorable first trip from Goulburn to Port Phillip, they having reached it on 14th December, 1824; and, as it forms a conspicuous feature in the district, they bestowed upon it the name of one of their patrons, Dr. Bland, of Sydney. As we approached the hill a slight shower occurred, but soon passed away. Beveridge is 25 miles from town and 980 feet above sea-level, and we found by barometrical observations that the highest point of the hill was about 420 feet higher. The ascent on the south-eastern side is not very steep. When the top was reached a vast amphitheatre, about a quarter of a mile across and sixty feet deep, revealed itself as the site of an extinct crater, perhaps responsible for much of the lava now forming the plains between it and the city. The crater is well defined, the floor measuring about 180 yards across. We walked round on the ridge to the new trig. station on the northern crest, and from there made a survey of the surrounding country. Unfortunately, the day was too dull and cloudy to pick out all that can be seen from it on a clear day, and it was with difficulty that we just made out the You Yangs, about fifty miles away. Of course, the Plenty Ranges, near at hand, were the most prominent of the many hills occupying the landscape. Having watched the Sydney express, looking like a toy train, laboriously climb the incline towards Wallan, we descended into the crater and over

the southern lip (the main breach is to the north-west) to the homestead at the foot, where we were kindly furnished with hot water, and were able to have an *al fresco* cup of tea, &c., before making for the station. The farm here is known as "Mount Fraser," hence the hill appears on Broadbent's map as "Mount Fraser." If we had missed the view from the top we were amply rewarded by a beautiful sunset, the colours of which require an artist's eye to describe. The station was reached in time for the 7.15 p.m. train, and by 9 p.m. we were saying good-bye to one another at Spencer-street. I would like to suggest, as a future excursion, that about the 14th December, 1924, the committee arrange to again visit the hill, and to invite the Historical Society to join in celebrating the hundredth anniversary of Hume and Hovell's visit to the hill. An account of the last Club visit, on 13th March, 1909, will be found in the *Naturalist* for May, 1909 (vol. xxvi., p. 4), in which greater detail is given.—F. G. A. Barnard.

In the Trans. Roy. Soc. S.A., vol. xlvi., 1922, Professor Osborn gives a sketch of the ecology of the Franklin Islands, a small group lying between Fowler's and Streaky Bay, towards the eastern end of the Great Australian Bight. These are low-lying, waterless, and composed of granitic rock covered with travertin and sand. Only thirty-four species of plants were observed there, mostly grasses, composites, and salt-bushes. All are found in this State. Professor Osborn concludes that the vegetation is in process of degeneration, chiefly from the burrowing of birds, and that it is fated to disappear utterly.

"The Gum Tree."—With the current number of the *Gum Tree* (March, 1923, vol. vii., No. 25) is issued a representation in colour of probably the finest specimen of a Scarlet-flowering Gum, *Eucalyptus ficifolia*, F. v. M., in the world. The tree is about thirty-three years old, and is now in its prime. It stands on the lawn in front of the club-house of the Metropolitan Golf Club at Oakleigh, near Melbourne, Victoria. When in full flower (as depicted in the illustration) there is perhaps no finer sight of its kind in the world. The tree is a very shapely specimen, being about thirty feet in spread of branches and the same in height. This species of eucalyptus is remarkable in many ways. In its restricted native habitat in the south-west of Western Australia it is a comparatively small tree, growing in tangled masses.* It seems to have improved in cultivation, and this particular specimen is worth travelling many miles to see when in bloom in January of each year.

*Maiden, "Critical Revision of the Genus Eucalyptus," part 43, and *Vict. Nat.*, April, 1921, vol. xxxvii., p. 142.

ON CONCRETIONARY LIMESTONES IN GENERAL, AND ON PEBBLES FROM LAKE OMEO IN PARTICULAR.

By F. CHAPMAN, A.L.S.

(With Plate.)

(*Read before the Field Naturalists' Club of Victoria, 12th Mar.*, 1923.)

I.—INTRODUCTORY.

SOME months ago, after reading his joint paper on "Where the Murray Rises,"* Mr. Chas. Daley, B.A., F.L.S., kindly handed over to me for examination some of the pebbles which he had collected from the shores of Lake Omeo whilst on a recent trip with Messrs. Williamson, Hughes, and Allen.

As I have been interested for many years in that much-neglected study of our so-called concretionary and chemically-formed limestones, a large percentage of which, I have good evidence to believe, are formed directly or indirectly through organic agency, it seemed an opportune moment to study these pebbles from Omeo and to give my results, with some general remarks on more or less similar limestones, to this Club.

Definitions of Concretionary Limestones.—Limestones, as we all know, may be formed in different ways. For example, by the deposition of carbonate of lime ($CaCO_3$) upon a foundation of leaves and twigs, as an encrustation. This is seen in the "fossil forest" of Sorrento, &c., where the tea-tree scrub has been invaded by a drift of calcareous sand, subsequently partially dissolved and re-deposited on the vegetation; or as in the Oaky Creek at Yass, where leaves of Peppermint and *Casuarina* cones are encrusted.† Or we may have a purely chemical deposit of $CaCO_3$, as in some banded travertins laid down by springs, as seen in our older sand-dunes along the Victorian coast, as at Warrnambool, Torquay, and Point Roadknight; also as stalagmites and stalactites in limestone caves, and pebbles on the floors of such places.

But probably the most important method of the formation of concretionary calcareous deposits is in the case of the limestones which are partially or wholly composed of nodular, cylindrical, or tuberose bodies more or less compacted to rock, but sometimes free or incoherent, as in the pink nodular limestone of the Mallee and South Australia and in the nodules such as we have on the shores of Lake Omeo.

Most of the text-books, ancient or modern, usually appear to avoid the description of concretionary limestone, and one

* Daley and Williamson, *Victorian Naturalist*, May, 1922, vol. xxxix., No. 1, Part I.: Physiographic and General Notes, Chas. Daley, pp. 4–12.

† A. J. Shearsby, "Notes on the Occurrence of Recent Travertin Formations in Oaky and Ravenswood Creeks, N.S.W.," *Vict. Nat.*, vol. xxxvii., 1920, p. 35.

text-book of sedimentary petrology does not mention the term. Oolitic structure, one of the forms of organic concretionary limestone, is well described in Harker's "Petrology,"* and there is also a good descriptive paragraph of such by Howchin in his "Geology of South Australia."† Speaking of the formation of oolitic and pisolitic structures of limestone, Prof. Howchin says:—"This process can be seen in operation at the present time in the formation of the 'lakestone' in the neighbourhood of Robe, where oolitic and pisolitic limestones are now in course of formation on the floors of shallow lakes between the sand-hills. . . . It is frequently seen in the limestone of the Flinders Ranges (Upper Cambrian), and is sometimes present in the 'pink' limestone of Brighton (S.A.)"

From his description, Howchin appears to assume that the carbonate of lime deposit is chemically precipitated on a *nucleus* of the alga *Girvanella*, a foraminifer, or other object. I am inclined, however, to think that the *bulk* of the deposit in these Pleistocene and Holocene accumulations is through organic agency. The structures of the lime-secreting blue-green algæ (*Cyanophyceæ*) are often excessively minute, and the thallus, when broken up by solution of the cellulose, forms a powder which cannot be distinguished from a "chemical precipitate." When, however, the stages from the one amorphous condition into the other organic thread-like structure is seen, the conclusion is obvious.

II.—Brief Notes on Some Australian Concretionary Limestones.

1. *Hard Concretionary Limestone Obtained in the Mallee Bores.* This peculiar form of limestone is generally of a pink to pale brown colour, due to a minute quantity of ferric oxide included in it. It seems to form extensive bands in the upper strata (Pleistocene and Holocene) of the Mallee and Wimmera districts, and was met with in several of the sub-artesian Mallee bores at varying levels.‡ A note given in the report below referred to states that ‖:—

"At several levels down to 90 feet, hard, calcareous, and concretionary limestone bands occur. One bed in particular, at 56–69 feet, appears to be a deposit such as is found at the present day in and around the saline lagoons in Central and parts of Southern Australia, which are inhabited by mollusca such as *Coxiella*, *Bulinus*, and other forms living in brackish

* Harker, A., "Petrology for Students," 2nd ed., 1897, pp. 247–249.
† "Geology of South Australia," 1918, p. 178.
‡ See Chapman, F., "Cainozoic Geology of the Mallee and Other Victorian Bores," Rec. Geol. Surv. Vict., vol. iii., part 4, 1916, pp. 345–347, 350, 354, 358, 375, 380.
‖ *Op. cit.*, p. 353.

water. These limestone deposits, found a little below the surface nearly all over the Mallee, are in all probability due, as explained by Howchin and Gregory,* to the effect of the hot sun and dry wind causing the evaporation of the surface moisture (sometimes one inch per day), and consequent upward suction of water charged with calcareous matter (sometimes ferruginous) from the lower depths. The deposition of this mineral matter takes place just beneath the surface of the loose soil, and results in a hard 'pan.'"

With regard to this limestone, which can also be seen in its loose, nodular state in the Ooldea (on East-West Railway) district of South Australia, my views have been somewhat modified since the above was written. It will be remembered that Prof. Tate referred to the nature of the "biscuit" limestone of South Australia in his note at a meeting of the Royal Society of South Australia.† He there stated that a fresh-water shell (*Bulinus*) can often be found as a nucleus of the flat, discoidal, limestone biscuits. This, together with other evidence from the Mallee concretionary limestones, shows the starting-point of the limestone biscuit, nodule, or other form is in a swamp or lake where the organic encrustation is likely to flourish. Their subsequent shapes seem to largely depend on the varying amount of rolling or skimming in the face of the wind to which they have been subjected. But it may be taken for granted that the further growth of the nodule does not take place until it comes to rest, or partially so, in a brackish lake. This surmise, founded on the facts before us, points in the direction of an organic origin for these concretions. And so it must have been, and, in fact, now is to a large extent, for the Lake Omeo concretions.

The examination of this hard Pleistocene limestone of the Mallee in thin sections under a high power of the microscope confirms the idea that the rock is almost purely of organic origin. Shells and ostracod valves are seen to be enwrapped with a finely-granular deposit which has all the appearance of a disintegrated calcareous plant thallus, and which bears positive evidence of its organic origin by being riddled through in places by the parasitic boring fungus allied to *Achlya*. Under a low power the generally laminated character of an encrusting plant organism can be clearly seen. The rock itself is often a perfect aggregate of these nodules, large and small, the interstices being filled in with detrital material, of sand, including sharp to well-rounded (wind-worn) quartz grains.

* Gregory, J. W., "Geography of Victoria," new ed., 1912, p. 94; also Howchin, W., Trans. R. Soc. S. Australia, vol. xxvii., part 1, 1903, p. 84.

† Trans. Roy. Soc. S. Australia, vol. xxii., 1898, p. 236.

2. *Note on a Calcareous Concretion from the Pleistocene of Kangaroo Island, S.A., collected by Mr. A. G. Campbell in* 1905. —I made a thin section of this rock at the National Museum many years ago, and it was kept for future reference. It throws a clear light on the origin of this style of concretion. Under the microscope it is seen to consist of numerous tiny balls of laminated structure, some measuring not more than 2 mm. in diameter, and all welded together by other enwrapping algæ. The vertical thickness of the laminæ in this example measures about .026 mm. Very often the thallus shows it to have been perforated with a boring fungus, the cavities of which are of a deep rich brown.

III.—On a Chemically-Deposited Accretion.

Some calcareous nodules collected by Mr. W. H. Ferguson, of the Victorian Geological Survey, from the Murrendal Caves, near Buchan, have been examined by me, but the full note has not yet been published.* The nodules are rounded to subspherical, and measure about half an inch to one inch in diameter. They are composed of numerous coats of varying density and colour, and are wholly crystalline, excepting for the nucleus, which consists of a fragment of igneous rock. These nodules are "formed from rolling fragments of *débris*, which are slowly covered by a deposit of travertin in regular layers."

IV.—A Description of Some Pebbles from the Shores of Lake Omeo, N.E. Gippsland, collected by Chas. Daley, 1921.

The specimens submitted to me have an average diameter of 2 to 3 cm. In colour they are pale grey to light ochreous, and externally have an earthy appearance, although they are hard to break open.

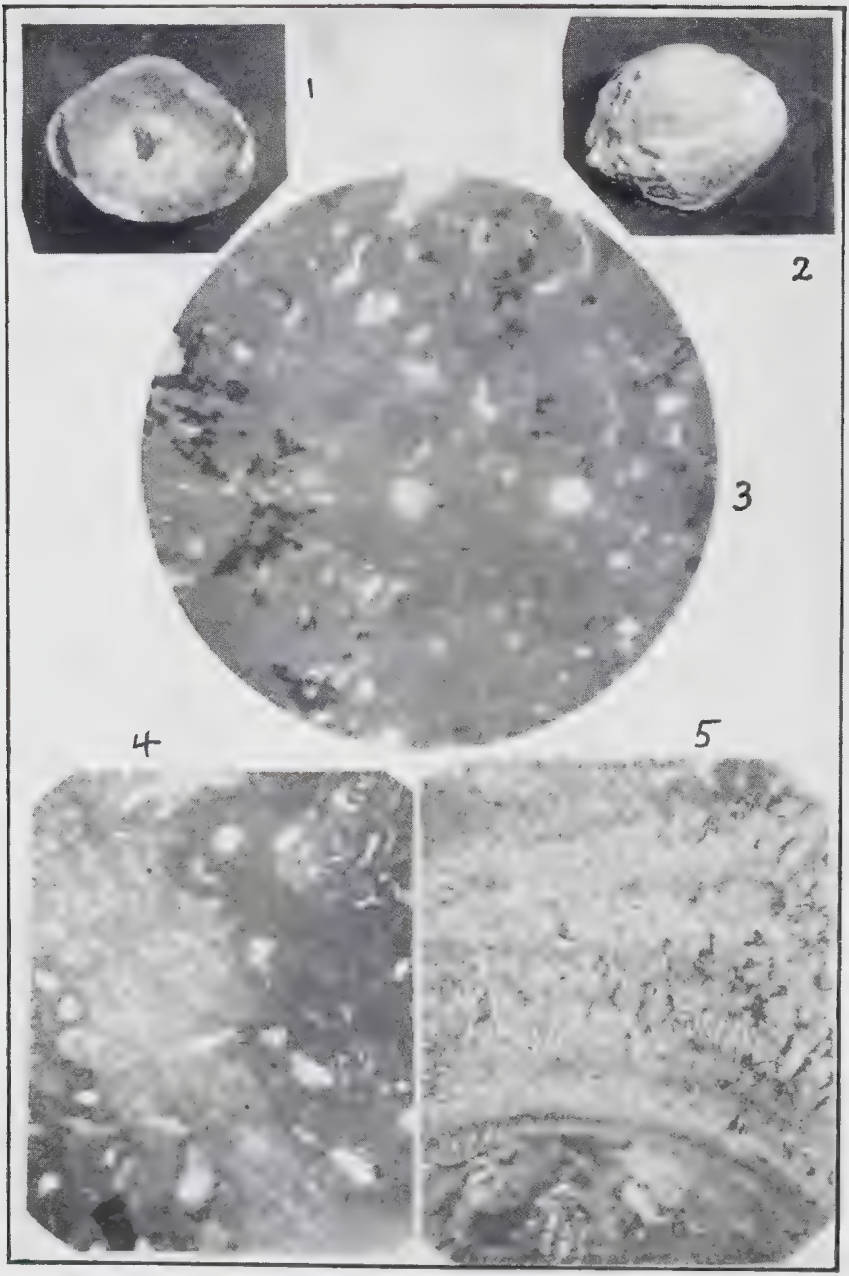
Under a low-power lens they show little or no concentric structure, excepting on the outer layers, which, by the way, are more ochreous than the inner.

They show a decided tendency to fracture along irregular joints, which, when the nodule is broken, exhibit on their surfaces minute clusters of dendrites (hydrous protoperoxide of manganese = H_2MnO_4) or Psilomelane.

The main part of the nodule, under magnification, consists of a kind of travertin paste, in which are embedded numerous organic remains. Their structure, however, is in most cases so altered by re-crystallization that it is difficult to specify

* The Director of the Victorian Geological Survey has given permission for this preliminary reference to be published (sent in 12/1/16).

PLATE I.



CONCRETIONARY NODULES AND MICRO-STRUCTURE.

F. C. *Photo.*

any particular organisms. We may say with certainty that calcareous algæ are present in considerable quantity. Some of these may be siphoneaceous in character, whilst others are presumably of the nature of *Characeæ*. In one instance a tubular stem is sliced through vertically, and showing the granular calcareous walls of a lime-secreting plant. In another instance we have horizontal sections of a hollow stem surrounded by a zone of trapezoidal outgrowths.

Remains of minute crustacea may be represented by fragments of the carapace and spinous appendages, and may possibly belong to the *Cladocera*. The altered shelly fragments seem to be referable in some cases to minute mollusca. There are also some puzzling, rotaline-looking tests present, which suggest foraminifera, and the only solution would be to surmise that they were washed out of older sedimentary rocks of the surrounding limestones. There is no doubt, however, that the nodules themselves are of quite recent date.

In concluding these brief notes, I would suggest the further study of these concretionary bodies forming limestones as a fruitful field of research. Its importance needs no emphasis from me, seeing that such a vast amount of material in the Australian sedimentary series is made up of these so-called concretionary limestones.

EXPLANATION OF PLATE.

Fig. 1.—A split concretionary nodule from Lake Omeo, showing a dark, ferruginous nucleus and a rudely concentric structure; collected by Mr. Chas. Daley. Nat. size.

Fig. 2.—Superficial aspect of a similar nodule from Lake Omeo. Nat. size.

Fig. 3.—Micro-section of nodule from Lake Omeo, showing dendritic structure and included organisms. × 16.

Fig. 4.—Micro-section of a calcareous concretionary nodule from Kangaroo Island, S.A., showing bundles of tubes of the thalli of lime-secreting algæ, also other included organisms; coll. by Mr. A. G. Campbell. × 16.

Fig. 5.—Micro-section of a chemically-deposited nodule from the caves at Murrendal, Buchan, showing the nucleus at base of a fragment of igneous rock, and the successive coats of aragonite (?) crystals forming zones of growth; collected by Mr. W. H. Ferguson; reproduced by permission of the Geological Survey of Victoria. × 16.

THE Saw Banksia, *B. serrata*, is found in the coastal district of southern New South Wales and Victoria as far west as Wilson's Promontory. In Tasmania it occurs only at the Sisters' Hill, on the North-West Coast, near Table Cape, where several specimens are growing on an area only a few acres in extent.

ON A NEW MARINE BIVALVE SHELL, *HEMIDONAX CHAPMANI*, SP. NOV.

By J. H. GATLIFF AND C. J. GABRIEL.

(*Read before the Field Naturalists' Club of Victoria, 9th April*, 1923.)

HEMIDONAX CHAPMANI, sp. nov.

Shell solid. Ovate triangular; inæquilateral; radiately striate, the striæ becoming stronger at the anterior angle, but towards the posterior end they gradually become broader and flatter, and are not continued beyond the rounded angle. Margin crenulate, and denticulate within on the ventral margin.

White, with discontinuous brown rays. Interior has usually, in adults, a large, triangular, purple blotch descending from the umboes.

Dimensions of Type.—Anterior–posterior diameter, 24 mm.; dorso-ventral, 15 mm.

Habitat.—San Remo, ocean beach, Victoria.

Observations.—We have collected very many valves of the above species, but only in one instance have we found a conjoined pair, and it is not half grown, and is uncoloured. Neither have we met with the shell in our numerous dredgings in Western Port.

It is the species listed by Pritchard and Gatliff as *Donax cardioides*, Lamarck. They followed the identification of Prof. Ralph Tate, and they received similar odd valves, much worn, that were obtained at Royston Head, Spencer's Gulf, South Australia.

In the *Victorian Naturalist*, vol. xxxi., page 83, we quoted this species as "being *H. australiense*, although it is much smaller, and might be considered distinct." Mr. Charles Hedley, F.L.S., has drawn our attention to the fact that it is distinct.

We have great pleasure in dedicating it to Mr. Frederick Chapman, A.L.S., palæontologist at the National Museum, who, in the various branches included in the science he studies, has done such excellent work respecting our marine mollusca of past ages.

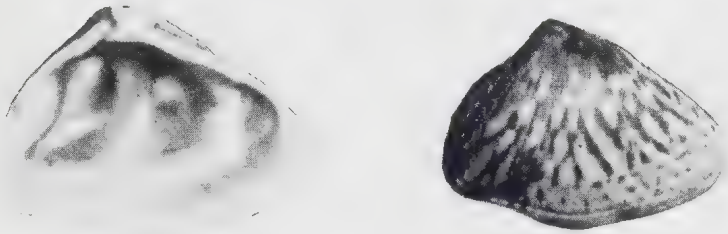
The valves figured are not quite the same size; the measurements refer to the larger valve. The figures are enlarged.

Type in Mr. Gatliff's collection.

BIRD NOTES.

CUCKOOS.—Interest in the habits of Cuckoos has been deepened by the observations recorded in "The Cuckoo's Secret" and the photographs that illustrate this remarkable book. Mr. Edgar Chance, the author, an English ornithologist, is convinced that *Cuculus canorus*, the common Cuckoo of British

PLATE II.



HEMIDONAX CHAPMANI, GATLIFF AND GABRIEL, n. sp.
(Enlarged.)

PLATE LI.

YOUNG NARROW-BILLED BRONZE-CUCKOO, *Chalcococcyx basalis*, Horsfield.
Photo. C. BARRETT

NEST AND EGGS OF BUTCHER-BIRD *Cracticus destructor*, Temm.
Photo. C. BARRETT.

bird-books, *always* lays its eggs direct into the victim's nest, "or into the opening to or mouth of such nest, and *never* inserts its own egg by way of its beak into the victim's nest." Further, he contends that "every species of Cuckoo, Cow-bird, or other parasitic bird in any part of the world also lays its eggs direct into the victim's nest in the aforesaid manner, and never inserts its own egg by way of its beak."

Here is a pretty problem for Australian bird-observers to solve. Some claim that certain Australian Cuckoos, notably the Fan-tailed, *Cacomantis flabelliformis*, lay their eggs on the ground and deposit them from the beak in the domed nests which they favour. It is generally believed, however, that the Pallid Cuckoo, *Cuculus pallidus*, selecting open, cup-shaped nests, lays its egg directly into them. A Cuckoo of this species has actually been seen sitting upon the nest of a Scarlet-breasted Robin, *Petroica multicolor*. I have found, often, an egg of the Fan-tailed Cuckoo in a nest of the White-browed Scrub-Wren, *Sericornis frontalis*, and wondered how it was deposited without the "door" of the nest being enlarged. Mr. Tom Fisher informs me, however, that he has more than once observed both Fan-tailed and Bronze Cuckoos, *Chalcococcyx plagosus*, clinging to domed nests, and has clear evidence that the eggs are deposited in the manner described in "The Cuckoo's Secret." I am inclined to believe that in all cases where domed nests are selected by Cuckoos this is the method adopted. In a letter to me, Mr. Edgar Chance states: "I quite agree that it is impossible for a Cuckoo in all circumstances to lay her egg *in* the nest, but I am now firmly convinced, just as are several other enthusiasts over here (England) who have studied the subject with me, that all Cuckoos invariably lay their eggs *into* the nest, even when they cannot sit upon the nest to lay."

It would be interesting to know the views of any members of the Club who have paid attention to the habits of our Cuckoos. We have yet a great deal to learn concerning these parasitic birds, and every observation is worth recording.

Butcher-Birds. The autumn song of the Butcher-bird, *Cracticus destructor*, is now being heard in districts near Melbourne, and even some of the outer suburbs. Though a fine songster, this species is "red in beak and claw." I have seen one darting upon a Blue Wren, *Malurus cyaneus*, and when Acanthizas and other small birds hear the notes that please our ears they fly to cover. But there is something in favour of *C. destructor* as a hunter: it preys upon rats and mice as well as little birds.

As it is proposed to devote a page, at least, in each issue of the *Naturalist* to bird notes, I hope that bird-lovers will

keep the editor supplied with items of general interest.—CHARLES BARRETT.

During the last six months many northern birds that rarely come south have appeared in the lightly-timbered country around the eastern suburban areas. It is quite apparent that the severe drought now raging throughout Australia has caused a general migration of birds towards the sea coast.

As early as 13th October a White-necked Heron, *Notophoyx pacifica*, appeared on Gardiner's Creek, where it remained for a few days, and then suddenly disappeared. However, it was subsequently found dead with a rifle bullet through its neck. This was an unfortunate occurrence, as this was probably the bird that had been visiting that locality for years past.

During the same month a small flock of White-browed Wood-Swallows settled in some box saplings. Here they nested freely in the *Bursaria spinosa* and *Acacia armata* bushes, and only left the district at the end of January. A solitary Masked Wood-Swallow was observed in the above flock when first noticed, but a week later this bird greatly exceeded the White-browed in numbers. They made but a brief stay, and not a bird remained after the end of November.

Four Nankeen Night-Herons, *Nycticorax caledonicus*, all in cinnamon-coloured plumage, were flushed from some dense tea-tree scrub bordering the Gardiner's Creek. Though these birds are regarded as nocturnal, they are almost equally as alert during the daytime as their congener, the White-fronted Heron.

The beautiful Regent Honey-eater, *Meliphaga phrygia*, which comes south at irregular periods, was noted on 22nd November. Other birds soon became aware of this bird's arrival owing to its pugnacious habits. Any bird that happened to come into close quarters with the Regents was furiously attacked and driven some distance away. In all, three pairs frequented the locality for nearly three months, when they gradually disappeared.

Both the Brown, *Cinclorhamphus cruralis*, and Rufous, *Cinclorhamphus rufescens*, Song-Larks arrived during October, and remained till the end of December and early February respectively. The former bird frequented the open grasslands, and only perched on fences on very rare occasions. The Rufous Lark spent most of its time in trees or singing in the air. The female is barely more than half the size of the male.

Stubble Quail, *Coturnix pectoralis*, appeared more plentiful than in previous years, but this may be accounted for by the luxuriant growth of grass that existed in the district during the spring months. When the grass dried the birds became

scarce, and eventually the whole of them disappeared. One particular pair had reared a brood by the end of November, and the young ones had just left the nest when I came unexpectedly upon them. The old bird, who was with them, immediately made a short flight, and the young concealed themselves so well that they could not be disturbed or found.

On two separate occasions a Black-shouldered Kite, *Elanus axillaris*, was seen disturbing Starlings. They were probably different birds, as one was seen in November and the other in January. Their white plumage harmonizes so well with the grey atmosphere that they become almost invisible at a short distance away.

Probably the rarest bird seen during the time under review was the Yellow-plumed Honey-eater, *Ptilotis ornata*. This bird was seen only once, and, although frequent searches were made, I could never locate it again. It is readily distinguished from the White-plumed Honey-eater, *Ptilotis penicillata*, which it greatly resembles, by its streaked breast and prominent yellow plumes.

In addition to the migratory birds, the locality was well represented with numerous stationary species. Undoubtedly last season proved extremely rich, not only in ornithology, but in botany and entomology.—D. Dickison. East St. Kilda.

MICROSCOPY AND AQUATIC BIOLOGY.

Now that the winter evenings are approaching, what better way of passing them could be imagined than by microscopical study? Objects of interest are so easily procured, even in the household itself, the garden, or the pond; and then what a world of beauty and variety of form is opened up to us! One of my most enthusiastic and, I might add, voluminous correspondents is a man who, at the age of *fifty-eight*, had his first glimpse of Nature through the microscope, and was so impressed with what he saw that he immediately became the possessor of an instrument, and spends most of his leisure time when not writing descriptions of what he saw and asking information about them—in the study of pond-life.

One of the most widely-distributed organisms, and one that can be collected all the year round, in some localities, is Volvox. At times it is so plentiful that the collecting net is filled with them at every dip; and what exquisite objects they are under a low power of the microscope! Beautiful crystal spheres studded with emeralds, gracefully revolving beneath our gaze. Volvox is one of those interesting organisms on the border line between plants and animals. It was formerly claimed by the botanist as a green algæ. Really, it is a type of

flagellate infusorian, and its place in Nature is between the single-celled Protozoa and the Metazoa, or many-celled animals.

Volvox consists of numerous biflagellate individuals connected by a fine network of protoplasmic threads, and embedded in a gelatinous matrix, from which their flagella project, the whole forming a hollow, spherical, actively mobile colony.

There are two species of Volvox found in our ponds—*V. aureus* and *V. globator*—distinguished by the shape of their individual cells, each of which contains a nucleus and a contractile vacuole. At the hyaline end of the cell where the flagella are inserted there is a pigmented spot—the so-called "eye-spot"; the rest of the cell is green, owing to the presence of chlorophyl corpuscles. In consequence of the presence of these, Volvox is *holophylic*—that is, it feeds as a plant does. In its method of reproduction Volvox is of much biological interest. Some of the colonies are asexual. In these a limited number of cells possess the power of dividing up into little clusters of cells: these clusters escape from the envelope of the parent colony and form new free-swimming colonies. In other colonies there are special reproductive cells, which may be called ova and spermatozoa cells.

Almost every young Volvox, when first discharged from the parent sac, already contains a certain number of enlarged zoids, destined in due time to become its own progeny; not only so, but long before its discharge, and while yet it exists as a daughter-cell within the cavity of the parent generation, these selected zoids are already visible as spots larger and darker than their fellows. As may probably be affirmed of all living organisms, its life-history would be incomplete without a process of sexual reproduction, and accordingly, after a long sequence of asexual generations, a strictly sexual process intervenes, from which result certain oospheres destined to lie dormant for a while, to resist the vicissitudes of condition and climate, and to reproduce the parent form in the succeeding year, when external conditions again favour its development.

Interesting as the life-history of Volvox is, it is troubled with a parasitic rotifer nearly as interesting. When examining Volvox one occasionally finds a colony inside the sphere of which a small rotifer is seen swimming. In other Volvoces may be seen two or three eggs of this rotifer, Proales, sp. It was my good fortune on two occasions to see this rotifer attacking and making his entrance into the Volvox. Swimming up to the Volvox, the rotifer fastened itself in some manner that could not be clearly seen with the objective I was using. Then the rotifer began to spin round rapidly on its longer axis, its head being close to the Volvox, and in a very short time it had cut or torn a small hole in the Volvox, through which it

squeezed itself, apparently with some difficulty. Once inside the colony it seemed quite contented, swimming freely in the cavity. When the eggs of this rotifer are observed inside Volvox it can be seen that development is proceeding. Often the young rotifer is seen moving in the egg, almost on the point of hatching. —J. Searle.

BOTANY NOTES.

Plant Sociology.—Apart from that of Dr. Cockayne in New Zealand, very little systematic work has been done on this side of the world, and this by a few only, like Professor Osborn, of Adelaide, and Miss Collins and Mr. A. A. Hamilton, of Sydney, in the matter of the analysis and classification of our vegetation (gynecology or plant sociology). In the study of the relation between it and its environment (habitat), and the estimation of the various factors constituting the habitat (autecology or plant ecology), almost nothing has yet been attempted. So far, the work done here has been mainly taxonomic and floristic, resulting in the more or less complete determination of the distribution and range of some of our species. On the other side of the world, however, an ever-increasing attention is being devoted to these departments of the great subject of geobotany. Only comparatively recently has it been clearly recognized that vegetation is naturally and inevitably subject to change to phases of progression or of degeneration and that stability in it is arrived at only when it becomes in harmony with its surroundings and continues, perhaps, for a very long time, but only as long as all the factors of the habitat remain unchanged. Plant communities then tend to be definite expressions in vegetation of existing conditions, and, when developed to the greatest possible degree, are termed climax. As Tansly expresses it, plant communities, like human communities, "are quasi-organisms governed by natural laws," and, under the most favourable circumstances, may rise, as in the close exuberance of a tropical rain forest, to the very acme of all vegetation, or, under adverse conditions, decline to the seeming nothingness of a desert. As an instance of the manner of investigating vegetation, the methods of Braun-Blanquet and Pavillard, two exponents of what Tansly, in the *Journal of Ecology* of November, 1922, terms the new Zürich Montpellier school, may be briefly referred to. Although there is still a great want of agreement in the terminology used by investigators and in the values given to the terms themselves, *association* seems now likely to be generally adopted as connoting a fundamental unit of vegetation. This association is a community of plants characterized by the

presence of one or more dominant species which are generally peculiar to it, and which give it a definite and easily-recognizable physiognomy. Parts of an association dominated by one or other of these are termed *consociations*, and minor but still definite groups of plants characterized by species other than the association dominants are termed *societies*. After a complete list of the plants in any particular association is made, the workers above-mentioned ascertain, by counting in small areas or by estimation in large, the degrees of *frequency*, *dominance*, and *distribution* of each species. Then their tendency to aggregate, or their *sociability*, their periodic changes giving rise to the different seasonal aspects or changes in the physiognomy of the association, and their degrees of *aggressiveness* or otherwise are measured. Comparison of similar types of vegetation reveals the amount of *constancy* of the species in these, and their *exclusiveness*, or the measure in which they are confined to them. *Life forms* are recognized, and Raunkiaer's system can be used for the establishment of biological spectra, as was done for the first time in regard to Australian vegetation in the very interesting paper, "On the Ecology of the Ooldea District" (Trans. Roy. Soc. S.A., vol. xlvi., 1922), by Mr. R. S. Adamson and Professor Osborn.

A New Botanical Work.—Admirers of Dr. Cockayne and of the fine work he has done in the plant ecology of New Zealand will be much relieved to learn that the manuscript of his book, "The Vegetation of New Zealand," which was sent to Germany for publication some time before the war, has at last, in his own words, "after more vicissitudes than any book has ever experienced, made its appearance about a year ago." The volume, which contains 335 pages of text and 95 fine illustrations, mostly from the author's own photographs, forms the 14th section of "Die Vegetation der Erde," edited by Engler and Drude. The edition was quickly sold out, chiefly in Europe, and only 25 copies were available for New Zealand. Unfortunately, no copies appear to have been obtainable here. According to a review in the *New Zealand Journal of Science and Technology*, the author, after describing the physical features and climate of the islands, deals with the many plant associations of the sea coast, lowlands, high mountains, and the outlying islands in a most exhaustive manner. He then discusses the origin of the flora, the geographical distribution of its members and their relation to the plants of other countries, and finally gives a brief account of its geological history. It is much to be regretted that we are, so far, unable to make ourselves fully acquainted with what is described as an "epoch-making work."

Vol. XL.—No. 2. June, 1923.

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THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria.

Published 7th June, 1923.

Hon. Editor: F. G. A. BARNARD, Esq.

The Author of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE.

BUSINESS PAPER FOR ANNUAL MEETING

MONDAY EVENING, 11th JUNE, 1923.

1. Correspondence and Reports.
2. Election of Members.
3. Nominations for Membership.
4. General Business.
   1. Annual Report and Balance-Sheet.
   2. Election of Office-Bearers for 1923–4.

      The following nominations have been made:—

      President:—Mr. C. Daley, B.A., F.L.S.
      Vice-Presidents:—Mr. E. E. Pescott, F.L.S.; Mr. J. Searle.
      Hon. Treasurer:—Mr. A. G. Hooke.
      Hon. Librarian:—Mr. H. Hughes.
      Hon. Editor:—Mr. F. G. A. Barnard.
      Hon. Secretary:—Mr. C. Oke.
      Hon. Assistant Secretary and Librarian:—Mr. H. B. Williamson, F.L.S.
      Committee:—Messrs. F. Chapman, A.L.S., J. A. Kershaw, C. S. Sutton, M.B., L. Thorn, and F. E. Wilson.

      Memo.—As the number of candidates nominated does not exceed the vacancies there will be no ballot.
5. Remarks by Exhibitors relative to their Specimens.

   Ten minutes' adjournment for discussion of Exhibits.
6. Reading of Papers and Discussion thereon.

   By Mr. T. S. Hart, M.A., B.Sc.—Botanical Notes about Bairnsdale and the Eastern Lakes.
7. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same that he may arrange for their bringing them before the meeting; such notices should, however, be brief.
8. Exhibition of Specimens and Conversazione.

   Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and *Naturalist*. Brief descriptions should accompany the exhibits for the benefit of fellow-members.

CHANGE OF ADDRESS.

Any Member whose address, as written on the wrapper of the *Naturalist*, is not correct should communicate with the Hon. Sec. *at once*, as it is intended to publish the Members' Roll in the July *Naturalist*. Street numbers are desired in all cases.

The Club year ended on 30th April last. Any subscriptions overdue should be forwarded to the Hon. Treasurer *at once*.

Subscriptions for 1923-4 are now due, and should be paid to the Hon. Treasurer as early as possible.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 14th May, 1923.

The president, Mr. C. Daley, B.A., F.L.S., occupied the chair, and about fifty members and visitors were present

CORRESPONDENCE.

From Messrs. W. E. Briggs, R. H. Croll, and Dr. Heber Green, members of the Melbourne Amateur Walking Club, advocating the permanent reservation of an area in the parish of Glenaladale, county of Tanjil (Gippsland), adjacent to the Mitchell River, on account of the splendid specimens of various indigenous trees growing there, such as Pittosporum, Manuka, Lilly-pilly, Myrsine, and Currajong, many of these being of exceptional dimensions, both in height, diameter of stem, and spread of branches. Twenty-seven species of birds were noted about the creeks intersecting the area, including the Lyre-bird, Wonga Pigeon, Bower-bird, and Black Cockatoo.*

After some discussion, in which several members took part, the letter was referred to the committee to take such action as was deemed necessary.

From Mr. A. Latham, secretary of the Victorian Society for the Protection of Animals, with reference to the export of live birds, and enclosing a copy of a letter received from the Comptroller of Customs on the same subject. The Comptroller said that "no promise had been given to the effect that any birds ordered prior to the issue of the recent proclamation will be allowed to be exported." In a following paragraph he said: "The position is that, when an application is made to export birds, it will be approved in instances where it can be shown that the birds had actually been obtained by the exporter in fulfilment of an order received before the proclamation was issued."

Considerable discussion ensued, in which Messrs. A. E. Keep, J. A. Kershaw, C. Oke, and C. L. Barrett took part. Mr. Latham said that the official attitude seemed to be to let the export of birds go on. He said that he had been to the ships to see how the business is conducted, and found that the birds were sent away in ordinary packing cases, of which one side had been replaced by wire netting. Such cages were found to contain ten to twelve Cockatoos or thirty to forty medium-sized Parrots. He moved that a letter be sent to the Comptroller asking that a date be fixed on which export shall cease,

* For an interesting description of the "Enchanted Gorge" see the *Argus* (page 8) of 2nd June.—Ed. *Vict. Nat.*

giving time for the dealers to dispose of their stocks, and also asking what societies or bodies would be represented on the proposed advisory committee.

The motion was seconded by Mr. A. E. Keep, and carried.

REPORTS.

A report of the excursion to Werribee Gorge on Monday, 23rd April (Eight Hours Day), was given by the leader, Mr. A. L. Scott, who reported a large attendance of members and an ideal day for the excursion. Owing to the continuous dry weather of the past three months the country was looking its worst, but, as compensation, the river was at its lowest, and thus excursionists were able to cross at places where at other times this was impossible. The geology of the Gorge was explained at several places, and the rugged scenery much admired by the visitors.

A report of the excursion to Healesville on Saturday, 28th April, was given by the leader, Mrs. E. Coleman, who said that there had been a good attendance of members and friends, who, however, had been disappointed in the objects of their search—orchids for, the autumnal rains having failed to appear, the country was so dry that, with one exception, there were no signs of the plants they had gone so far to seek. The exception was the Autumn Orchid, *Eriochilus autumnalis*, of which a few flowers were found. A pair of leaves of *Chiloglottis diphylla* was the only other sign of orchids in a locality which is usually considered a good one for these plants. Under these circumstances it was decided to pay a visit to the new Maroondah dam in course of construction in connection with the water supply for Melbourne. Lunch was taken near the "Echo" tunnel, and in its neighbourhood a number of interesting birds, such as Blue Wrens, Fire-tailed Finches, Flame-breasted Robins, were noted. Later, Donnelly's Weir was visited, and its pretty surroundings of ferns and scrub much admired.

GENERAL BUSINESS.

Messrs. A. G. Hooke and F. Keep were duly elected to audit the Club accounts for 1922–23.

Nominations of office-bearers for 1923–24 were then made.

Mr. E. Cox referred to the absence of a safe crossing-place at the eastern end of the Werribee Gorge, and moved that a letter be written to the Tourist Committee, pointing out the necessity for some improvement in the present conditions. This was seconded by Mr. A. E. Keep, and carried unanimously.

PAPERS READ.

1. By Mr. Reginald Kelly, entitled "Thrips: an Unpopular Insect, treated Popularly."

The author gave some account of the life-history of the family and the results of his observations in Victoria, together with a list of the Australian species recorded to date. A number of species were exhibited as microscopic objects in illustration of the paper.

Remarks on the paper were made by Messrs. Pescott, Davey, and Oke.

2. By Mr. C. Hedley (communicated by Mr. C. Oke), entitled "On a Thalassoid Element in the Australian Molluscan Fauna."

The author called attention to the fact that the genus Coxiella, represented by a small shell found both in fresh and saline inland waters, and originally recorded from a salt lake near Mount Arapiles, Natimuk district, Victoria, is almost identical with the marine genus Truncatella, thus indicating a true thalassoid fauna. The shell in question, *Coxiella striatula*, has had so many changes of its name that he included a list of synonyms, with authorities, and urged further study of this interesting feature.

Messrs. Barrett, Oke, and Barnard referred to the presence of this shell near Melbourne, Mr. Oke stating that he had noted it at Elwood, while Mr. Barnard said that it is to be found on the shores of small lagoons near the Skeleton Creek at Laverton.

NATURAL HISTORY NOTE.

Mr. H. W. Davey, F.E.S., read some notes concerning a pair of Western Australian lizards, *Moloch horridus*, Gray, which he had in captivity for about six months.

EXHIBITS.

By Mr. F. G. A. Barnard.—Dried flowers of *Grevillea victoriæ*, gathered near the Leviathan Rock, Buffalo Ranges, 14th April, 1923.

By Mr. C. Barrett, C.M.Z.S.—Stone axe (broken), found on sand-dune at Middle Brighton, Victoria.

By Miss R. Currie.—Foliage, flowers (unexpanded), and expanded "bolls" of the cotton plant, grown at Lake Boga, Victoria, 1923.

By Mr. H. W. Davey, F.E.S.—Photo. of male and female *Moloch horridus*, from Western Australia, and a stuffed specimen of the "Horned Toad" of California.

By Mr. C. Oke.—Spirit specimen of the Western Australian "Devil," *Moloch horridus*.

By Mr. R. Kelly.—Nineteen species of thrips as microscopic objects, in illustration of paper.

By Mr. A. E. Rodda.—Head of fresh-water Cat-fish, *Tandanus tandanus*, and preparation of shoulder girdle bones of

same, showing method of locking fine spines in the position of defence.

By Mr. J. Searle.—*Idolothrips spectrum* a giant member of the thrips family.

By Mr. A. L. Scott.—Pebbles from Oamaru, New Zealand, typical of the pebbles and gravel that form the Canterbury Plains in every respect except in size; tubes of sand from streams near Mount Cook Hermitage.

By Mr. L. Thorn. A case of Orthopterous insects, including four species of leaf and stick insects, Phasmidæ—two from Victoria and two from Queensland; four species of short-horned grasshoppers, Acridiidæ; three species of long-horned grasshoppers, Locustidæ, including a fine specimen from Mount Bogong, collected by Mr. A. J. Tadgell.

After the usual conversazione the meeting terminated.

Articles by members have recently appeared in *The Emu* by Dr. MacGillivray entitled "Interesting Conduct of the Southern Stone-Plover, *Burhinus magnirostris*," and in the *Australian Museum Magazine* by Mr. C. L. Barrett, C.M.Z.S., entitled "Some Birds of Prey."

Forests and Water Conservation.—A forcible article dealing with the question of re-afforestation, from the pen of Mr. E. G. Ritchie, Engineer of Water Supply, Melbourne and Metropolitan Board of Works, appears in the *Gum Tree* for March, 1923. Many will be surprised to learn that he considers the common bracken the greatest obstacle to re-afforestation that exists. Its vigorous rooting system overpowers the young seedling eucalypts, while its thick growth assists and helps forest fires. It is practically valueless, and, usually owing to fallen timber and stones, is quite unable to be cut by any machine in a practical way. He is strongly opposed to the removal of big timber from any land required for water supply purposes, because when such timber is removed its place is rapidly taken by bracken, which cannot be controlled in any way, and soon forms an impenetrable tangle. The Mountain Ash, *Eucalyptus regnans*, is particularly liable to destruction by fire in its sapling state, and requires all the protection that can be given to it. Mr. Ritchie's article should be placed in the hands of every person in authority concerned in water conservation, to be read and re-read and acted upon at every opportunity. The present drought is forcing the question of water supply home in many areas: let us therefore beware of handing over the elevated portions of our State to the grazier or the sawmiller.

NOTES ON THE COLEOPTERA OF NORTH-WESTERN VICTORIA.

PART IX.

By J. C. GOUDIE.

(*Read before the Field Naturalists' Club of Victoria, 12th March, 1923.*)

WHEN dealing with the Scarabæidæ in these notes (*Vict. Nat.*, Dec., 1919, p. 119), the genus Heteronyx was purposely omitted pending the completion of a revision of the genus by Mr. A. M. Lea, F.E.S., entomologist of the South Australian Museum. By the courtesy of Mr. Lea I am now enabled to record all the species collected by me in the Mallee districts, as follows :—

Heteronyx auricomus, Blackb.
H. debilis, Blackb.
H. dimidiatus, Er.
H. insignis, Blackb.
H. jejunus, Blackb.
H. setifer, Blackb.
H. testaceus, Blackb.
H. xanthotrichus, Blackb.

The above are small, hairy, red or brown beetles which feed on eucalypt leaves, and are often seen flying about the tree-tops in numbers on summer evenings. During the day many of them may be found buried in the loose soil round the butts of trees.

ELATERIDÆ.

The beetles belonging to this family are a remarkably homogeneous group, not only from their uniformity in general appearance and sculpture, being narrow and elongate, but particularly from the presence of an ingenious spine and sheath process on the under side, which enables them to bounce upwards from any hard surface, and thus, no doubt, often escape from their enemies. Generally speaking, they are moderate-sized, dull-coloured beetles, nocturnal in habits, hiding by day under the bark of trees or under logs, stones, &c. On summer evenings they often fly indoors to the light, and bounce about on the table with a clicking noise. Since Candeze wrote his monograph on the family but little of a systematic nature has been published, so that probably many new species await description.

3072. *Lacon gultatus*, Cand.
3073. *L. humilis*, Er.
3077. *L. laticollis*, Cand.
3098. *L. variabilis*, Cand.

The species of Lacon are very common and widely distributed,

being found in large numbers under stones or logs on the "headlands" of cultivation paddocks. They are of obscure colours, and rather flattened in form.

3114. *Tetralobus australasiæ*, Gory.
3118. *T. fortnumi*, Hope.

T. fortnumi is a fine species, measuring $1\frac{3}{4}$ inches; it is dark brown or black. The males have the antennæ strongly pectinate. *T. australasiæ* is a similar but smaller beetle, and is more often met with.

3136. *Monocrepidius australasiæ*, Boisd.
3144. *M. castaneipennis*, Macl.
3145. *M. cerdo*, Er.
M. commodus, Blackb.
3152. *M. fabrilis*, Er.
3160. *M. macer*, Cand.
3168. *M. plagiata*, Cand.
3177. *M. seniculus*, Cand.

The species of Monocrepidius are the slender brown or reddish "Clicks" which fly indoors to the light in thundery weather. Sixty-seven species are recorded by Masters.

Cardiophorus dursus, Cand.
3219. *C. fulvosignatus*, Cand.
3224. *C. venustus*, Cand.

These are small beetles found under bark. *C. dursus* is shining black, with the basal half (nearly) of the elytra red. *C. venustus* has the prothorax pale red, the elytra dark, with two yellow spots on each.

3250. *Crepidomenus æneus*, Cand.
3251. *C. australis*, Boisd.

C. æneus is a slender, nearly black beetle, with a metallic gloss; it is three-quarters of an inch long. *C. australis* is smaller, also with a slight metallic sheen, which is rather an unusual feature in this family.

Æolus australis, Cand.

A small, dark brown species, with yellowish markings near the apex of elytra.

3281. *Anilicus semiflavus*, Germ.

A fairly common insect. It is black, with about two-thirds of the basal area of elytra red or yellow, and measures three-eighths of an inch.

RHIPIDOCERIDÆ.

3315. *Rhipidocera mystacina*, Fab.

A rather handsome species about three-quarters of an inch

long. It is black, thickly spotted with white. The males have beautiful pectinated antennæ. It is often seen flying over new clearings or resting on fences.

3321. *Psacus attagenoides*, Pasc.

At first sight this might easily be mistaken for one of the Dermestidæ, or "skin-weevils." It is a quarter of an inch in length, dark brown, mottled with spots and patches of whitish pubescence. Specimens were taken at Sea Lake in flood waters.

DASCILLIDÆ.

Helodes victoriæ, Blackb.

This is an uncommon beetle. It is about the size and shape of Psacus, but is shining brown, with short yellow pubescence on the elytra. Taken on Golden Wattle, which grows freely in the Sea Lake district.

MALACODERMIDÆ.

The members of this family are known as "soft-skinned beetles"—that is, the elytra and other parts have not that horny or leathery texture common to most beetles, but are soft and fragile. In his comprehensive and valuable treatise * on this group Mr. A. M. Lea remarks: -"The species almost entirely live on flowers or on leaves, and feed on nectar or on other insects; the larvæ of but few species are known, but those of the Lycides live in rotting wood or underground."

Metriorrhynchus occidentalis, Blackb.

3356. *M. rhipidius*, W. S. Macleay.

These beetles have the head, legs, and the small, strongly-ridged prothorax black, the deeply-furrowed, soft elytra red or yellow. *M. occidentalis* has a narrow black marking on the suture, not reaching base or apex of elytra. Both species (and several others of the genus) have a well-developed rostrum. The first-named measures one-half, and the latter five-eighths of an inch.

3383. *Telephorus nobilitatus*, Er.

A pretty blue and yellow species, under half an inch long; rather rare locally, but common nearer the coast.

Laius armicollis, Lea, Trans. Ent. Soc. London, 1909, p. 161, fig. 4.

3395. *L. bellulus*, Guer.

3399. *L. cinctus*, Redt. = *Mastersi*, Macl. = *femoralis*, Blackb.

* Trans. Ent. Soc. London, June, 1909.

L. distortus, Blackb., Tr. Roy. Soc. S.A., 1886, p. 264.
L. flavopictus, Lea (?), *loc. cit.*, p. 166.
L. mirocerus, Lea, Tr. Roy. Soc. S.A., xli., 1917, p. 130, fig. 3.
L. nodicornis, Blackb., *loc. cit.*, p. 264.
L. sculptus, Lea, Tr. Ent. Soc. London, p. 162.
L. villosus, Lea, P. L. S. N.S.W., 1898, p. 566.

The species of Laius, though small, are very attractive in appearance. They are of bright colours, usually red, with metallic blue, purple, or green bands on the elytra. They are numerous and widely distributed, being recorded from all the States. In the males the third joint of the antennæ is usually greatly enlarged, forming a distinct knob near the head in these otherwise filiform appendages. This character is of great importance in the identification of species, as in scientific descriptions of insects the male is always, when possible, taken as the type. *L. armicollis* is a rare species, distinguished from all others by a horn-like projection on the front margin of prothorax. *L. mirocerus* is likewise unique in the genus in having the antennæ strongly pectinate or comb-like. So far it has only been taken at Sea Lake.

3420. *Carphurus cervicalis*, Germ.

This beetle resembles some of the Staphylinidæ, the elytra being very short, about half the length of the abdomen. It also has the elongate, narrow form of those insects. It measures three-eighths of an inch, and is generally reddish, with green or blue elytra.

Helcogaster oxytcloides, Lea, Tr. Roy. Soc. S.A., xiv., 1921, p. 123.

A small, shining black beetle, with yellow prothorax.

Dasytes fuscipennis, Hope, Tr. Ent. Soc. Lond., 1845, p. 105.

A widely-distributed species. It is dark brown, rather flat, and parallel-sided, clothed with long dark hair, and is about a quarter of an inch long. In his re-description of this insect Mr. Lea remarks:—"On the prosternum, between each coxæ and the apical angle, is a large fovea, at the bottom of which is a roughly circular, flat space (this may be an enormously developed spiracle). There is nothing exactly like it on any other beetle known to me."

D. australiæ, Lea, var., Tr. Ent. Soc. Lond., 1909, p. 245.

This is a minute species, bronzy-black, and clothed with white pubescence. It sometimes occurs in thousands on wattle blossoms.

NOTES OF A NATURALIST IN NEW ZEALAND.

By A. L. Scott.

(*Read before the Field Naturalists' Club of Victoria, 12th Feb., 1923.*)

It is hardly right that a member of this Club should visit New Zealand without trying in some way to pass on to his fellow-members some of the pleasure and profit of the trip. As my leaning is principally towards geology, you must pardon me if my remarks deal mainly with that branch of natural science. I have about fifty slides, which I hope will interest you, and possibly in some ways they will speak more eloquently than I can.

My trip lasted two months, during which time I was able to visit some of the most famous places of both the North and South Islands. Of the sea trip to Wellington there is little to relate except that it was very smooth until we reached Cook Strait, where, as the slide shows, we took some water on board.

Landing at Wellington (North Island) on the 6th March, 1922, I left twelve hours later by the fine ferry steamer *Wahine* for Lyttelton, the chief port of Canterbury (South Island), and thence proceeded to Christchurch and Timaru. This fast vessel, though a "ferry," is larger than many ocean-going liners. She has a good turn of speed and a fine record of war service as despatch vessel and mine-layer, as set out on a shield in a companion-way. Having set myself to cover the main portion of two islands in so limited a time, my impressions are necessarily based on limited experience, and cannot do full justice to the places visited. Christchurch, however, appealed to me most of all the cities I saw. Wellington, Auckland, and Dunedin are all fine places, each with its own attractions (I did not see Napier); but the fine streets, parks, and buildings of Christchurch, its water supply, its level site and extensive plain with mountains close at hand, and particularly the fine weather I experienced, have all combined to place Christchurch in a setting of its own among my recollections. From Christchurch rail was taken to Timaru, where a stay overnight was made, and thence inland by motor to Mount Cook—a trip of 130 miles, lasting from 8 a.m. to something after afternoon tea time. Mount Cook, New Zealand's highest peak, is 12,350 feet high, and words and pictures both alike fail to adequately convey the romance, the fascination, and the wonderful grandeur of the scenes in the neighbourhood. For two weeks I stayed at the Hermitage (really a fashionable, if isolated, hotel), and I could willingly have spent my whole time there.

In a talk of such a place an audience looks for something at least a little sensational. With the help of the guides visitors can obtain just as much, or as little, of sensational adventure

as is good for them. My own most thrilling episodes are not illustrated. Obviously, a decidedly nervous tourist, standing at 5.30 a.m. on the Great Tasman Glacier in ice-steps cut on a ridge between two crevasses, is not going to take a time photo. of the situation. Such a suggestion might even have caused the guide to develop a gift of speech like his axe—sparky and cutting. This glacier is said to be the biggest thing of its kind south of the line outside the Antarctic. The trips to it, graded carefully to meet the ability of the tourist, are deservedly "star" features among the many attractions of the Hermitage. The vast quantity of moraine, shown repeatedly in the slides, and the scarcity of striated pebbles, were striking to one whose sole previous experience of glacial action had been derived from an all too slender study of the Bacchus Marsh deposits, where striated pebbles are so much in evidence.

Very striking also to the visitor are the broad valleys between the towering mountain ranges; the swift-flowing, anastomosing streams; the size and number of the boulders moved, and the rapidity with which they are worn down, as judged by the distance carried from the place of origin. The rapidity of wear, however, may be more apparent than real, as a very slight change in the gradient of a stream has a great effect on the size of the *débris* forming its burden. It is of these and the West Coast streams that the saying goes that they are too kind to drown a man—they knock his brains out on a stone first.

Heights, distances, and levels are very deceptive. There is no horizon to give one a line of reference. The valleys are broad, and appear so level that it takes a little time to get accustomed to finding such swift streams in them. Likewise with heights and distances. The air is clear, and there is no standard of reference. From the Hermitage lawn one sees, about three miles away, Kea Point, which overlooks the Mueller Glacier. The return trip makes a pleasant morning's outing, but the usual estimate of the distance by visitors is half a mile, and some won't believe otherwise until they have gone half-way there.

As some people have an idea that every able-bodied, intelligent visitor to New Zealand climbs Mount Cook, I would emphasize that visitors to the Hermitage fall into two classes—tourists and high-climbers. The latter, like musicians, must be first born and afterwards made; and not every high-climber succeeds in making the ascent. It was towards evening on my first day at the Hermitage that I met the impressed tourist. He had, he stated, just returned from "the gates of hell." This was not the name of a topographical location, but a metaphorical description of part of the trip that he had just com-

pleted. "Only rocks and ice" someone may say, but I doubt if anyone, unless perhaps a native born and bred among them, can ever get really accustomed to the rivers of ice, the crevasses, and the towering snow-clad mountains, with their precipices, ridges, snow-fields, and gravel slides. To a newcomer, launched suddenly, unprepared, into the very midst of them, the effect must be little less than terrific.

It was my good fortune to make the Malte Brun Hut trip up the Great Tasman Glacier and to encounter a variety of conditions in the course thereof. I must explain the huts. These are the objectives of the tourists, the jumping-off places of the high-climbers. They are built in various places, some on easy tracks, the majority high on mountain sides. They consist, so far as I saw them, of two rooms opening into each other, and each opening directly to the outer world. Both are fitted with bunks. The smaller, in addition, being the ladies' room, has the washstand. The larger has the kerosene stove, the bookshelves, the mouse-proof lockers filled with blankets and food, the table, and all other luxuries. This is the living room and men's quarters. Other necessary provision is made. At the Ball Hut, for instance, is accommodation for horses. This hut is in the Great Tasman Valley, in a valley between the Wakefield spur and the lateral moraine of the glacier. To reach it is a pleasant thirteen-mile walk over gravelled valley and mountain-side tracks. This constitutes the first stage of the outward trip, and may be ridden if desired. At the hut we saw, as expected, one seagull and a solitary Paradise Duck, whose mournful call sounded the reverse of joyful.

Next day we proceeded a little further up this minor valley, over a couple of ridges of very rough moraine, and on to the ice of the glacier itself. That ice was not smooth. Imagine the sea on an average day. It is all waves and troughs. Freeze it suddenly, and you have some idea of the Great Tasman Glacier as I found it. There were flat areas in it, but the greater part of our journey up was among these frozen ridges —sometimes in their valleys, sometimes transversely. As the Malte Brun Hut is 2,500 feet higher than the Ball Hut, and ice, like water, only runs downhill, it will be understood that the ten-mile walk from hut to hut entails some work. Add to this the constant climbing of small ridges, too high to take comfortably in one step, only to have to descend them in the next step, and the constant watchfulness required to avoid slipping, and to escape stepping into the streams that so often, though not always, run along the troughs.

The surface of the ice was much honeycombed. In the bottom of each cell lay a grain of dirt. Occasionally a larger hole would be seen; in it would lie a pebble. The dark rock

absorbing the heat was thus gradually melting its way down; but where the dirt lies thick there is no melting, but a hill of ice beneath the rock which has acted as a shield against the sun. For, as the surface of a glacier is not smooth, neither is it, in general, clean, but covered with dirt and *débris*. Sometimes in great islands, sometimes in long strips, and sometimes the troughs between the waves were almost like garden walks, strewn with fine grit. On these the going was as good as on a footpath. The honeycombed ice was little worse. Occasionally slippery patches were met with; but at all times a look-out had to be kept for runaway holes, usually only an inch or so in diameter, but occasionally wide enough to take a man down into the cold depths. The water lying or flowing in the valleys was usually frozen over, and one quickly learned to tell instantly whether the surface would bear, break, or required testing.

The weather was so threatening that on one occasion we decided to change the programme for an easier trip; but a little later, fortunately, we again altered our minds and resumed the original programme. Arrived at the edge of the glacier at the foot of a steep bit that takes one up to the track to the Malte Brun Hut, a little Blondin work had to be done to get past the crevasses. There was only a little, and that little I did not relish. Arrived at the hut, we refreshed ourselves, and admired the view while enjoying a well-earned rest. At sundown the weather broke. We turned in early and listened to the thunder and the wind. The lightning was distant, but the thunder thundered none the less; and anon, as a giant roll seemed to challenge all the world to a roaring match, the wind would come with a whoop that would completely drown the thunder, while the hut seemed to strain against its moorings. And so it went on all through the Saturday night. Said an old hand later, "Yes, it can blow some at Malte Brun." And indeed that remark seems to apply to the whole valley and some, at least, of the tributary valleys. A curious thing about the gusts, more noticeable at night, was that just before the loudest came there would often be a lull, then a slight noise that could almost be described as a "click," then presto! whoop! down came the gust. With the morning the weather moderated, but, as the wind still came up in sharp squalls, it was not possible to start homeward that day. From time to time one would look out at the door and say, "It looks like clearing," then hastily bang the door to keep out the driving rain. After much consultation of the barometer a start was made at five on Monday morning.

The rain had polished the ice, the storm had made it move, the crevasses had opened out. For the first part of our return journey it was only possible for the tourist to keep his feet in

the troughs, where there was nowhere to slip to, or in hollows on the broader ridges in which powdered snow lay. The crevasses had greatly extended sometimes on one side, sometimes on both sides; they sloped away like great conchoidal fractures into the icy green depths. I did not ever see down any very great depth; the things just steeply sloped and curved away out of sight under overhanging ice. After studying them for a little, as occasion offered, I came to the decision to give undivided attention to the steps that the guide had to cut on the glassy ridges. A crevasse on one side is not so bad you always have a chance, if an accident should happen, to fall to the other side; but a crevasse on each side is "over the gate," as the saying goes. Keeping my eye very strictly on the business in hand, it presently came as a pleasant shock to find that the last crevasses had petered out, and that we were among the old familiar "frozen waves"—no longer with the honeycombed surface of Saturday, but slippery as glass, so that, watching every step, we kept as much as possible to the long valleys. Changing to another valley meant step-cutting or else a bodily rolling over the polished ridge. To finish briefly, thanks to the altered conditions, our return journey to the Ball Hut (ten miles) took eight strenuous hours thrice as long as would have been ordinarily expected; but the guide, in spite of loaded rucksac and other responsibilities, turned never a hair. After lunch and a rest at the Ball Hut we did the remaining thirteen miles to the Hermitage comfortably in under four hours. I would not have missed that trip for a lot; but that Monday night, and for a little after, I did not want any more glaciers at present, thank you.

Another interesting trip made a few days later was that up the Mueller glacier to the Mueller Hut *via* the Green Rock. I have not, however, any slides relating to it. We returned over the ridge of the mountains. Leaving the hut, we climbed up the mountain side into a snow storm, over the ridge, and then, after a short clear space, descended into a rain storm, and arrived home thoroughly drenched. You take the weather as you find it over there, and healthy people observing ordinary precautions are apparently none the worse for it rather the contrary, for the tradition is that almost everyone dies of old age.

Here are some slides illustrative of the country round Queenstown and Glenorchy, both on Lake Wakatipu. The Scott Memorial in Queenstown Park is most appropriate. A great boulder, borne from afar by long dead glaciers, now rests near the strange lake. On one side tablets have been fixed bearing record to the high achievement and cheerful suffering displayed in the carrying out of a noble adventure. Though not included

in the itinerary, I also show some slides of Milford Sound to round off the subject.

From Queenstown to Dunedin, city of Scotchmen, thence to Oamaru, noted for stone and the streets named after English rivers—Eden, Thames, Severn, and so on. Like so many of the New Zealand towns, Oamaru is a city of fine churches, usually well filled on Sundays. Idyllic green hills surround it. The railway line runs along the seashore, so that in heavy weather the spray must surely dash against the passing trains. Thence to Christchurch once more and across the island to Greymouth *via* Otira Gorge. The railway through was soon to be finished, but then (and perhaps still) a portion of the journey must be made by coach. It is to be hoped that, for the sake of the tourist, the railway time-tables will be so arranged that those desiring it may always be able to take the coach through the famous Gorge. Of Greymouth I have at present no slides available, though there are some striking photos. on the table. Like the rest of the fair West Coast, it is a place of heavy rainfall. There also is a notorious bar, reputed to be the worst in the South Island and the second worst in the Dominion. The swift river meets the rollers of the ocean, and their mutual strife raises an ever-shifting bar. A northward current hurries along the coast. The vessel that gets out of hand while going through the narrow entrance is almost certainly doomed. Usually she piles up on the north mole, where some of the plates of the last victim, the *Perth*, were still visible at the time of my visit.

Thence I went by train and motor to Westport through the famous Buller Gorge, of which, and the current-driven ferry across that river, I have here some views. Thence by motor to Nelson through picturesque country of which I have no slides. Crossing Cook Strait by a small ferry to Wellington, I went next to the Thames, an important mining and farming locality, famous in bygone times for its stupendous gold production—noted also for the apparent uniformity, to the eye, of its rocks, which, under the microscope, show very great diversity. A feature of New Zealand is the large amount of wood construction, which necessitates corresponding precautions against fires. Iron fire-escapes outside the buildings and directions inside to the nearest exit are the regular thing. In Thames they go one better. The fire bells are in the streets, and a slide is here shown of the largest.

The itinerary took me next to Rotorua, the centre of the hot-lake district, where the weather was on the damp side. At Rotorua, which is a most interesting place, I spent about a week. Excellent motor services cater for the tourist traffic to all the notable places. About two miles out of the town is

Whakarewarewa, commonly called "Whokka." At the end of the town itself, but on the other side of it, is Ohinemutu. Of part of "Whokka" I show a slide. It is a decidedly picturesque place, with hill and valley and scrub. It is, however, no place to move about in on a dark night; the Maoris themselves avoid that, for hot springs and geysers lie in wait everywhere. They appear to be cooling, though one can never be sure that an apparent cooling is not merely due to a blocking of the "pipes," so to speak, which may lead to trouble elsewhere. An interesting feature at "Whokka" (and also Ohinemutu) is that the villagers' domestic operations are all carried on by natural heat. One spring is kept for boiling potatoes, another for scalding pigs, another for laundry, others for bathing, and so on. By the side of a path is a pedestal with an urn on top, naturally formed. This, says the guide, is the pot where a famous chief boiled the brains of an equally famous rival whom he conquered. The hot spring that did the work has since ceased, and the "pot" has been cold for many a year. Two or three slides show features about the notorious Fryingpan Flat, and the series closes with one of a trout fisher at work (or play?). Nearly all the pleasure-seekers of the Dominion seem to be disciples of Izaak Walton.

In conclusion, I would say that to my mind New Zealand is a *beau ideal* of a holiday resort. It is not one country, but a dozen. For myself, I felt most of the time, but particularly while in the Mount Cook country, like a child at its first pantomime—dazed and enchanted with wonder and delight.

As some of you may at some time contemplate a visit to New Zealand, it may be worth while saying a word or two regarding the literature available useful to a naturalist. There is in New Zealand a voluminous literature of New Zealand travel. The trouble, however, is to find the precise information one requires about the particular place one is for the moment interested in. There is a good collection of well-selected books—perhaps two or three hundred—at the Mount Cook Hermitage, but elsewhere I quickly found that my best plan was to visit the local library at first opportunity and get the Geological Bulletin dealing with the district—not for the sake of the geology (which, though always glanced at, often received very scant attention), but for the sake of the reliable authentic information as to history, industry, &c., usually to be found therein—information that otherwise it would have been practically impossible to obtain. These Bulletins have not yet been issued for all places, but there are a considerable number available. The system, however, broke down at two places where I rather felt it. At Queenstown, on Lake Wakatipu, the librarian, with sympathetic disgust, informed me that there was nothing of that

sort on his shelves. It was only on my trip down the lake, *en route* to Dunedin, that, through the kindness of the master of the vessel, I first saw the Bulletin for the district—a most interesting compilation, dealing largely with glacial action. Had a copy of it been in the library, at least one of my days in the town would have been spent to better advantage. The other place was Rotorua. The attendant there was quite cheerful over the total absence from their library of anything in the nature of books dealing with the locality; yet every shop, almost, had popular pamphlets about the wonders of the district. Lest we ourselves be unduly high-minded, I will further add that I once asked in Maryborough (Vic.) library if they had any publications dealing with the district, more particularly the geology. I was told they had nothing of the sort, "but Mr. So-and-So at the High School is interested in those things, and the mining registrar has plans." I did not pursue the matter further. In refreshing contrast was the attitude of the attendant in the Dunedin library who, without a word, by her manner conveyed the idea that geology was the one thing in a library that could or should really interest anyone. Marshall's Geology and Park's Geology were both most useful, and books by surveyors and pioneers, such as Harper's "Pioneer Work in the Alps of New Zealand," were always worth reading when one had time. Miss Du Faur's book also, though only mountaineering, should be read both before and after a visit to the Mount Cook Hermitage.

BIRD NOTES.

THE REGENT PARROT.—Some of the trivial names for Parrots adopted by the Check-list Committee of the Royal Australasian Ornithologists' Union are more pleasing than the old ones. The "Smoker" or "Rock Pebbler," *Polytelis anthopeplus*, has been re-christened Regent Parrot, and the name is well deserved. No one who has seen these splendid birds in their haunts, flying with sunshine gleaming upon their plumage, will gainsay their right to a more dignified title than "Smoker." Indeed, they are so beautiful that in shadow even their yellow and olive plumage has a dim magnificence. Sunlight transforms them into golden birds.

Regent Parrots are becoming rare, and now, in Victoria, are wisely protected. Their headquarters during the breeding season, in our State, are at Whyperfield, the Mallee National Park, where I have seen them at their best. Early in November the nest hollows in gnarled old River Gums, *Eucalyptus rostrata*, Schl., contained fledgelings, some nearly ready to fly. Many of the hollows were empty. Bird-trappers had been

raiding the district, and their trail was marked by desolate homes of Parrots and Cockatoos. "Smokers" have long been regarded as "fair game"—not to be killed, but to be taken into captivity. They are excellent whistlers, learn to talk rather well, and are most engaging in their ways. But the toll has been too heavy, and now it is certain that, without strict protection, the Regent Parrot will become one of the rarest birds in Victoria.

At a Mallee homestead I made the acquaintance of a "Smoker," pent in a packing-case cage. He had been a pet for years, but was no lover of strangers. My friendly advances were met with snapping beak and notes that betokened both anger and scorn. Often, listening unseen, I enjoyed this unsociable Parrot's contented monologue. He had a charming habit of conversing softly with himself no distinct notes, no mimicked human utterance, but a ripple of joyous and musical sounds. Instantly, when I came from cover, the Parrot became aggressive, and scolded me for spoiling his tranquil gossip with himself.

Talking Cockatoos.—Which species of Cockatoo is the best "talker"? Lately I heard a fine specimen of the Western Long-billed Cockatoo, *Licmetis pastinator*, "laugh" and "cry" and "talk" so humanly that I am inclined to advance the claims of the species to the championship. "Tom" belongs to Mr. Young, of Christmas Hills (Vic.) He was brought from Western Australia some years ago, and has long been famed in the hills district. He dances to his own accompaniment, "Lull-a, lull-a-la," utters merry "Ha! ha! has!" when bidden to laugh, and makes a sound not unlike crying when pretending to be sad. His repertoire includes the usual phrases that pet Cockatoos are taught to repeat, and others more original. His enunciation is excellent; he does not slur the words as some talking birds are apt to do. "Tom" is a favourite with children, and nothing pleases him more than to "show off" with a ring of smiling faces around his cage. His speech is "almost human," and many of his actions display intelligence. —Charles Barrett.

The Gang-Gang Cockatoo.—In a huge white gum near the edge of the Orbost road, between Colquhoun and Nowa Nowa, a pair of Gang-Gang Cockatoos, *Callocephalum galeatum*, selected their home. During early October, 1921, the birds were lurking about the tree, and apparently cleaning the hollow for nesting purposes. It was not till nearly two months later that the female commenced to lay. The birds were quite safe

from being robbed, as the nesting hollow was over 80 feet from the ground in a tree whose trunk was free of branches to a height of 40 feet. It is not remarkable that the nest of the Gang-Gang is so rarely found, especially when so few people are familiar with its shy habits. Shortly after sunrise the male bird would be heard screeching in the nesting tree, and would then disappear for the rest of the day. Towards evening it would reappear and again utter a few screeches. Although the country was unselected almost in a virgin state yet this was the only pair seen during a week's sojourn over an extensive area of that locality. However, in the western portion of Gippsland, about Neerim, it is at times quite plentiful. Several small flocks, comprising from five to eight birds, is a daily sight in the heavily-timbered country. Several years ago a pair was observed feeding in the hawthorn hedges near Buln Buln, where they remained till well into winter, until the berries were done. Each succeeding year brought more Gang-Gangs to devour the berries, and finally the autumn congregation numbered no less than forty birds. They were noisy feeders, as they used to crush the stone inside the berry, and their whole attention appeared to be concentrated on picking and eating the berries. When thus engaged it would be possible to approach within a few yards of them. Invariably a sentry would be perched on an elevated position, keeping watch, but it lacked the vigilance of White Cockatoos' sentries. Though Eastern Victoria is the stronghold of Gang-Gangs, and they are familiar to all settlers, yet very few Gippslanders know it by its proper name. D. Dickison, East St. Kilda.

MICROSCOPICAL STUDY IN THE HOME.

Anguillula.

If a small drop of the cloudy sediment left in the vinegar cruet is placed under a low power of the microscope, it will be found to be teeming with transparent, thread-like worms, the so-called "vinegar eel," *Anguillula aceti*, belonging to the widespread and destructive group of Nematode worms. The wriggling mass under the microscope comprises individuals of all sizes, from that of the newly-hatched worm up to a fully-grown specimen measuring, perhaps, one and a half to two millimetres. They are about thirty times as long as broad, and are widest about the middle, tapering slightly towards both ends. The head is blunt, rounded, with a circular mouth, while the tail tapers off to a sharp point. The œsophagus generally has a constriction, giving it a bilobed appearance. The ovary is a simple tube, and the ova are very large.

Closely allied to the vinegar eel is the "paste worm," *A. glutinis*, that develops in vast numbers in paste that is turning sour. They are smaller than the vinegar eel, and not so lively in their motion. A still smaller species, *A. fluviatilis*, is found amongst Spirogyra, &c., in pond water.

Some of these worms are very tenacious of life. It is said, though I have never verified the statement, that they can be thoroughly dried, and remain so for long periods, when, if they are again placed in water, they swell out and again function as living animals, eating and reproducing. It is recorded of an allied species, *Tylenchus tritici*, which causes the disease known as "ear-cockles" in wheat, producing galls that take the place of the grains of corn, that they can survive in dryness for twenty years. If one of these blackened grains be divided, the interior will be found to contain a white cottony moss, like bundles of fine fibres closely packed together. If a portion of this is put on a glass slip with a drop of water under a cover glass, in a very short time it will be found to be a wriggling mass of life, the apparent fibres being really Anguillulæ. Other species live in the soil and attack root crops, such as onions and potatoes, doing great damage and causing great loss to the growers.

Cobb, an able naturalist, more appreciated in U.S.A. than he was here, when in Australia described over eighty species of these Nematodes, more than half of which were new. There is a large field here for the practical worker; will some of our younger members take it up?

Moulds (Mucor).

When the housewife opens a pot of her home-made jam and finds it covered with mould she is rather annoyed at the discovery; but had she taken the precaution to thoroughly sterilize the jam pots by boiling them for thirty minutes or so immediately before using, and hermetically sealing them as soon as filled with the hot jam, the minute air-borne spores of the mould could not have gained access, and her preserves would have remained sweet and wholesome.

These despised moulds are very interesting objects to the microscopist, and may be obtained for study any time by soaking a slice of stale bread in water and covering it with a bell-glass to prevent evaporation. After three or four days a white, flocculent mould will be seen on the bread. Upon examination it will be found to consist of long unbranched stalks (hyphæ), which ramify the substance of the bread: from these thinner branches are produced, which re-branch until it has the flocculent appearance just mentioned. Soon portions of the hyphæ grow erect in the air, and the tips swell into tiny

knobs (sporangium), glistening white at first, but gradually darkening into a mass of sooty spores. If we place some of these spores in a drop of sterilized fruit juice in a moist chamber under the microscope, we can watch them swell and germinate and finally produce the branched mycelium from which new sporangia will develop. If we are *very* fortunate we may observe the formation of a *zygospore*, a black body large enough to be seen by the naked eye, which is another means Mucor has of reproducing itself.

Other moulds that may be grown on bread are Aspergillus, which forms strings of spores, and Penicillium, with a number of strings of spores attached to the tips of the branches. They may thus be identified.—J. Searle.

"The Australian Museum Magazine" for April, 1923 (vol. i., No. 8), is to hand, with a nice selection of well-illustrated articles which are not too technical for the ordinary reader. In fact, every real naturalist should become a subscriber to this magazine, which is well printed and produced. The subscription, one shilling per part (four yearly), with one penny each for postage, should be forwarded to Messrs. Angus and Robertson, Castlereagh-street, Sydney.

Forestry.—The Victorian Forests Commission is sending out specimen copies of the *Australian Forestry Journal* for March, 1923 (vol. vi., No. 3), with a circular asking for the support of tree-lovers both as subscribers and contributors. We trust that some of the members of the Field Naturalists' Club will give it what help they can. The journal is published in Sydney under the direction of the Forestry Commissioners of New South Wales. The subscription is four shillings per annum. Editor's address, 25 O'Connell-street, Sydney, N.S.W.

Ring-tailed Phalanger. During a brass band recital in the Maldon shire hall reserve recently, about 8 p.m., a small phalanger, probably the Ring-tailed species, was seen advancing slowly and carefully in a sitting posture along a telephone wire, until it reached a position almost immediately above the band stand, where it remained calmly seated for fully a quarter of an hour, apparently enjoying the music. The reserve is full of trees and shrubs, but the wire was evidently selected as being the most convenient both for approach and retreat. It was not a tamed animal, but one of several which live unmolested in a wild state about the precincts. When the music ceased the little acrobat retired complacently by the way it had come.—J. C. Goudie. Maldon, 9/3/23.

Correction.—In May *Naturalist*, page 15, line 13, for "gynecology" read "synecology."

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The Victorian Naturalist:

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— OF —

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Published 5th July, 1923.

Hon. Editor: F. G. A. BARNARD, Esq.

The Author of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 9th JULY, 1923.

1. Correspondence and Reports.

2. Election of Members.

As Ordinary Members—	Proposer.	Seconder.
Miss Stella Lambert, "Walcot," Malvern-grove, Malvern.	Mr. C. A. Lambert.	Mr. H. B. Williamson, F.L.S.
Sister Ethel Forsyth, Repatriation Hospital, Caulfield.	Mr. C. A. Lambert.	Mr. H. B. Williamson, F.L.S.
Mr. Ian Macgillivray, Ormond College, Parkville.	Mr. J. A. Kershaw, F.E.S.	Mr. F. Chapman, A.L.S.
Mr. David Newmarsh, 108 Heidelberg-road, Ivanhoe.	Mr. J. A. Kershaw, F.E.S.	Mr. F. Chapman, A.L.S.

3. Nominations for Membership.

4. General Business.

5. Remarks by Exhibitors relative to their Specimens.

Ten minutes' adjournment for discussion of Exhibits.

6. Reading of Papers and Discussion thereon.

By Mr. A. N. Lewis—"Effect of the Ice Age on Tasmanian Topography." (Illustrated with lantern views.)

7. Reading of Natural History Notes.

Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and *Naturalist*. Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Club year ended on 30th April last. Any subscriptions overdue should be forwarded to the Hon. Treasurer *at once.*

Subscriptions for 1923–4 are now due, and should be paid to the Hon. Treasurer as early as possible.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The forty-third annual meeting of the Club was held at the Royal Society's Hall on Monday evening, 11th June, 1923.

The president, Mr. C. Daley, B.A., F.L.S., occupied the chair, and about sixty members and visitors were present.

REPORT.

A report of the excursion to Green Gully, Keilor, was given by the leader, Miss I. Crespin, who said there had been a good attendance of members, and an interesting afternoon had been spent in studying the geological features of the district, a number of interesting specimens of fossils, &c., being obtained.

ANNUAL REPORT.

The hon. secretary, Mr. C. Oke, read the forty-third annual report for the year 1922–23, which was as follows:—

"To the Members of the Field Naturalists' Club of Victoria.

"Ladies and Gentlemen,—In presenting the forty-third annual report of the Club for the year ended 30th April, 1923, your committee desires to thank members for their hearty support during the past twelve months, and to congratulate them on the continued success of the Club.

"Commencing the year with 282 members and associates on the roll, there were elected 28 ordinary, 8 country, and 3 associate members. Deaths numbered 6 and resignations 12, leaving a membership of 303, showing an increase of 21 for the year.

"It is with deepest regret we have to record the death of several well-known members of the Club. In July Mrs. J. Simson and Mr. W. Stickland passed away. In August there occurred the death of Mr. F. Spry, entomologist to the National Museum, who had been a member for over forty years. In October Mr. A. Borthwick died. In November another member of forty years' standing, Mr. J. Gabriel, passed away: he was one of the Club's most energetic workers, especially in connection with the wild-flower exhibitions, when he always rendered most valuable services. Finally, in December, Mr. J. R. Tovey, assistant at the National Herbarium, died. Reference to each of these was made in the *Naturalist* at the time, and the committee desires to place on record the very great loss the Club has sustained by the death of these members.

"The monthly meetings have been held regularly, and both the scientific and popular sides of the Club's work have been, as usual, well maintained. There has been an average attendance of about 60 members at the meetings, and the papers, with the discussions that have followed their reading, have been interesting and instructive. The following papers and lectures have been delivered:—May—'Introduction and Spread of Noxious Weeds,' by Mr. H. W. Davey, F.E.S.; June—Presidential address, 'Twixt Bass Strait and Southern Ocean,' by Mr. F. Chapman, A.L.S.; July—'A Simple Study of Our Common Serpula,' by Mr. P. C. Morrison; August—'A Circuit of the Grampians,' by Mr. J. W. Audas, F.L.S.; September—'Some Autumn Orchids,' by Mrs. E. Coleman, and 'An Entomologist in the Dandenongs in Winter,' by Mr. C. Oke; October—continuation of Mr. Oke's paper: November—'A Trip to the North and North-West from Broken Hill,' by Dr. Macgillivray; December—(1) 'Notes on the Measurement of Tall Trees,' by Mr. A. D. Hardy, (2) 'Common Salt: its Manufacture and Relation to Animal Life,' by Dr. MacCallum; January—'On a Cast of a Sea Urchin from the Red Sands of Studley Park, Kew,' by Mr. F. Chapman, A.L.S., and holiday experiences by members; February—(1) 'Notes of a Naturalist in New Zealand,' by Mr. A. L. Scott, (2) 'Notes on the Victorian Chlamydopsini (Coleoptera), with Descriptions of New Species,' by Mr. C. Oke; March—(1) 'On Concretionary Limestones in General, and on Pebbles from Lake Omeo in Particular,' by Mr. F. Chapman, A.L.S., (2) 'Notes on the Coleoptera of North-Western Victoria, Part IX.,' by Mr. J. C. Goudie, (3) 'Our Alpine Flowers,' by Mr. H. B. Williamson, F.L.S.: April—(1) 'Notes on the Protozoa of the Melbourne District,' by Mr. J. Stickland, (2) 'On a New Species of Marine Bivalve Shell, *Hemidonax Chapmani*,' by Messrs. Gatliff and Gabriel. The papers may be summarized as follows:—Zoology, 3; entomology, 3; botany, 4; geology, 3; palæontology, 1; general, 3.

"The committee during the year decided to purchase a lantern, and it is now available for the use of members who may wish to exhibit slides of interest at the Club meetings. The committee hope that members will bring forward suitable slides and exhibit them for the benefit of fellow-members.

"The excursions are still as popular as ever, and form one of the most important branches of the Club's activities. Twenty-eight excursions were held during the year, fourteen being to places near the metropolis on Saturday afternoons. Whole-day excursions have been held to Evelyn, Belgrave, Langwarrin, You Yangs, Yarra Junction, Pakenham, Nar-Nar-Goon, Upwey, Werribee Gorge, and Healesville, while more extended trips

have been made to Bendigo, Natya, and Torquay. Unfortunately, both the Christmas and Easter trips were cancelled, as it was impossible to obtain accommodation on short notice.

"In June the Club held an exhibition of natural history specimens in the Athenæum Hall. This was opened by Sir Baldwin Spencer, K.C.M.G., and proved very interesting, but, through our inability to obtain the Town Hall, was not a great financial success. However, it resulted in £3 2s. being added to the finances of the Club, after donating £7 7s. (from the sale of flowers) to the Children's Hospital.

"The annual exhibition of wild-flowers was held in the Town Hall on Tuesday, 3rd October, and was opened by Sir Robert Best. It was a great success, though the usual quantities of flowers were not received, due, no doubt, to the dry season. To all those who helped to make this event so successful the committee desires to record its very best thanks, and more particularly to the ladies' committee, which rendered such splendid service. A sum of £149 3s. 1d. was cleared, of which £76 was donated to the Children's Hospital. A letter of thanks was received from the hospital committee, and inviting this Club to nominate three life-governors. By a vote of the Club, Messrs. Daley, Barnard, and Pitcher were nominated, and duly made life-governors of the hospital.

"Your committee has given considerable attention to the subject of prohibiting the export of our native birds and mammals and the introduction of foreign birds, and was represented on deputations dealing with these subjects to the Minister of Trade and Customs and to the State Chief Secretary. From assurances received it is hoped that the export of our native birds will soon cease. It has also had under consideration the reservation of further areas for the preservation of our native fauna and flora.

"The hon. secretary of the Plant Names sub-committee reports that its work is practically completed, inasmuch as the census of Victorian plants, with their vernacular names and brief details as to their distribution, is now in the hands of the printers, and should be ready for issue at an early date.

"At the February meeting of the Club, eight members elected in May, 1880, and who still belong to it namely, Messrs. Bale, Barnard, Best, Dixon, French, Pitcher, Sloane, and Wisewould —were elected honorary life-members in recognition of their continuous membership and their valued services during that long period.

"The thirty-ninth volume of the *Victorian Naturalist* has been completed, and once again your committee desires to place on record its great appreciation of the untiring devotion of the honorary editor to producing the Club's journal. The

demand for the journal overseas is still very great, and may be taken as an indication of the interest in Australian natural history. Your committee has decided that the time is ripe for an effort to permanently enlarge the *Naturalist* both as regards letterpress and illustrations. This, of course, will add considerably to the printing account.

"The hon. librarian reports that during the year numerous valuable donations have been received, and several volumes dealing with Australian natural history in its various aspects have been added to the library.

"Your committee regret that two of its members have intimated that they do not desire re-election owing to pressure of other engagements—Mr. F. Pitcher, who has been hon. treasurer since 1919, and looked after the accounts so carefully, and Mr. P. R. H. St. John, who has had charge of the library since 1915, and who has spent many an hour looking after the books in his care. To both officers the committee tender their very best thanks for the services rendered, and would like to express the wish that the Club have the pleasure of having them again as office-bearers at no distant date.

"The hon. treasurer reports that the ordinary receipts for the year amounted to £200 14s. 3d., and the expenditure to £231 18s. 5d., showing a debit balance of £31 4s. 2d., but this has been met by the balance from last year. Arrears of subscriptions considered good should make up this deficiency. The intended increase in the size of the *Naturalist* will, however, quickly absorb a large portion of this balance.

"The attendances at committee meetings have been as follows: Messrs. Oke, 13; Barnard, 12; Sutton, 12; Williamson, 12; Daley, 11; Pitcher, 11; Tadgell, 10; Chapman, 9; St. John, 8; Barrett, 7; Searle, 6; Pescott, 4.

"In conclusion, your committee desire to express their gratification at the way their efforts to uphold the work of the Club, and to further its aims, have been supported by all members, and hope that this support will be extended to the incoming committee.

"On behalf of the committee,

"CHAS. DALEY, *President.*
"CHARLES OKE, *Hon. Sec.*

"Melbourne, 11*th June*, 1923."

On the motion of the chairman, seconded by Mr. E. E. Pescott, F.L.S., the report was received and adopted.

FINANCIAL STATEMENT.

The hon. treasurer (Mr. F. Pitcher) read the financial statement for 1922–3, which was as follows:—

RECEIPTS.

To Balance, 30th April, 1922				£44 4 11
,, Subscriptions—				
Ordinary Members	£133 4 6			
Country Members	23 10 0			
Associate Members	2 12 6			
		£159 7 0*		
Victorian Naturalist—				
Subscriptions	5 1 9			
Sales	2 0 6			
Advertisements	9 5 0			
Reprints	3 4 7			
		19 11 10		
,, Sales of Badges		0 17 6		
,, Donations—				
Publishing Fund		8 17 0		
,, Interest—Savings Bank and War Loan ..		12 0 11		
			200 14 3	
,, Fares, Char-a-banc Excursion, Warrandyte, August, 1922			10 18 0	
,, June Exhibition—				
Admissions		23 5 0		
Sales of Flowers		7 15 3		
Donation		0 5 0		
			31 5 3	
,, Wild-flower Exhibition—				
Admissions		140 17 0		
Sales of Flowers		62 15 11		
Refreshments (profit)		14 0 0		
Donation		0 14 0		
			218 6 11	
				£505 9 4

* Subscriptions :—Arrears, £19 ; 1922–3, £135 19s. 6d. ; advance, £4 7s. 6d.—total, £159 7s.

EXPENDITURE.

By *Victorian Naturalist*—				
Printing	£141 19 2			
Illustrating	13 7 4			
Free Reprints	7 17 9			
Reprints Charged	0 16 3			
		£164 0 6		
,, *Victorian Naturalist*—				
Wrapping and Posting		20 9 0		
,, Rooms—Rent and Attendance		13 17 6		
,, Library—				
Periodicals and Books ..	£6 9 11			
Insurance	0 7 0			
		6 16 11		
,, Hire of Lantern		1 14 0		
,, Printing		6 9 0		
,, Postages, &c.		7 6 6		
,, Purchase of Lantern, &c.		9 3 0		
,, Donation—Native Fauna Poster		2 2 0		
			£231 18 5	
Carried forward			£231 18 5	

Brought forward				£231	18 5
By June Exhibition—					
Athenæum Hall and Attendance	10	11	0		
Printing and Advertising	3	5	0		
Purchase of Flowers and Plants	1	0	0		
Cartage, &c.	3	18	3		
Donation—Children's Hospital	7	7	0		
				26	1 3
,, Wild-flower Exhibition—					
Town Hall and Attendance	39	15	4		
Printing and Advertising	8	5	6		
Cartage, &c.	6	3	2		
Purchase of Flowers and Plants	14	19	10		
Donation—Children's Hospital	76	0	0		
				145	3 10
,, Melbourne Town Hall—Deposit Wild-flower Exhibi-tion, 1923				18	0 0
,, Char-a-banc Excursion, Warrandyte, August, 1922				14	5 0
				435	8 6
,, Balance in Savings Bank	50	0	0		
,, Balance in London Bank	20	0	10		
				70	0 10
				£505	9 4

F. PITCHER, *Hon. Treasurer.*
30*th May*, 1923.

Audited and found correct.
A. E. KEEP,
A. G. HOOKE, } *Auditors.*
6*th June*, 1923.

The following statement of assets and liabilities was also read :—

ASSETS.

Balance Savings Bank and London Bank		£70	0 10
War Loan Bond		20	0 0
Arrears of Subscriptions (£50), say		25	0 0
Deposit (1922-3) in Savings Bank		175	0 0
Badges on hand		0	17 6
Deposit in Savings Bank for Plant Names Publication		150	0 0
Library and Furniture (Insurance Value)		150	0 0
		£590	18 4

LIABILITIES.

Subscriptions paid in advance			£4	7 6
Char-a-banc Fund	£10	0 0		
Less Warrandyte Excursion	3	7 0		
			6	13 0
Deposit for Plant Names Publication			150	0 0
			£161	0 6

On the motion of the chairman, seconded by Mr. E. E. Pescott, F.L.S., the statements were received and adopted.

The hon. treasurer read a further statement showing the credit balances of the wild-flower exhibitions, 1916-22, and the objects to which they were devoted, being as follows:—

1916—Town Hall	£131	6s. 10d.,	Y.M.C.A. Soldiers' Work.
1917— ,,	£212	5s. 1d.	Ditto.
1918— ,,	£141	2s. 9d.	Ditto.
1919— ,,	£167	3s. 5d.,	half to Anzac House Fund, half to Plant Names Publication Fund.
1920— ,, (Upper Hall)	£107	13s. 6d.,	Plant Names Fund.
1921—Athenæum	£150	6s. 7d.,	Club Funds.
1922—Town Hall	£149	3s. 1d.,	£76 to Children's Hospital, £73 3s. 1d. to Club Funds.
	£1,059	1s. 3d.	

This record, he thought, would be interesting to country members, who were somewhat at a disadvantage regarding the Club's activities.

ELECTION OF OFFICE-BEARERS.

There being only the requisite number of nominations, the following office-bearers were declared duly elected:—President, Mr. C. Daley, B.A., F.L.S.; vice-presidents, Messrs. E. E. Pescott, F.L.S., and J. Searle; hon. treasurer, Mr. A. G. Hooke; hon. librarian, Mr. H. Hughes; hon. editor, Mr. F. G. A. Barnard; hon. secretary, Mr. C. Oke; hon. assistant secretary and librarian, Mr. H. B. Williamson, F.L.S.; committee, Messrs. F. Chapman, A.L.S., J. A. Kershaw, Dr. C. S. Sutton, L. Thorn, and F. E. Wilson.

On the motion of Messrs. J. Stickland and J. H. Harvey, a vote of thanks was unanimously passed to the retiring office-bearers, with special mention of the services of Messrs. Pitcher and St. John.

PAPER READ.

By Mr. T. S. Hart, M.A., B.Sc., entitled "Botanical Notes about Bairnsdale and the Eastern Lakes."

The author gave a description of the main features of the plants of the Bairnsdale district, and showed how their distribution was affected by the geological formations of the area.

Messrs. Chapman, Williamson, Pitcher, and Barnard remarked on the very great interest of the paper, the latter suggesting that Mr. Hart be asked to supply a map for publication with the paper, indicating the geological formations and plant associations.

EXHIBITS.

By Mr. A. G. Brown.—Bark of *Eucalyptus sideroxylon* (a

portion of middle bark in which some unusual hardening condition had taken place), also leaves, buds, flowers, and fruits; wood of *Eucalyptus polyanthemos*, Red Box, also leaves and fruit; *Eucalyptus viminalis*, leaves, buds, and fruits; *Eucalyptus botryoides*, Mahogany Gum, leaves and fruits; *E. coriacea*, leaves and fruits, and photograph of tree; wood and bark of *Hedycarya angustifolia*, Austral Mulberry; wood and bark, also wood (polished) of *Myrsine variabilis*, Mutton-wood—the two last-named from Noojee.

By Miss I. Crespin.—Fossils from Green Gully, Keilor, including fossiliferous ironstone, polyzoal and foraminiferal limestone.

By Mr. C. Daley, F.L.S.—Native stone axe from Brighton Beach; also photograph of forest scenery on road from Yarra Junction to Warburton, *viâ* Powelltown, Neerim, and M'Veigh's.

By Mr. J. E. Dixon.—Specimens of *Oxycarenus frenchii*, a small hemipterous insect recently found in thousands among *débris* and stones in Yarra Park and on the bank of the Yarra near Church-street bridge, Richmond.

By Miss A. Fuller.—Large series of dried plants from New Zealand.

By Mr. T. S. Hart, M.A., B.Sc.—Dried specimens, photographs, &c., in illustration of paper.

By Mr. A. E. Keep.—Red ochre, Ostracoda in Travertine limestone, and *Cerithium flemingtonense*, a Janjukian gasteropod—all from Green Gully excursion.

By Mr. C. Oke.—Specimen of moth, *Chelepteryx collesi* (male), taken at St. Kilda—very rare in such a locality.

By Mr. E. E. Pescott.—The Great Shielded Grasshopper, *Megalodon ensifer*, from Papua.

By Mr. A. L. Scott.—Tubes of coloured sand from Rainbow Mountain, near Rotorua, N.Z.

By Mr. J. Stickland.—Photo. of columnar rock formation at Trentham Waterfall, Victoria, by Mr. J. Stickland, jun.

After the usual conversazione the meeting terminated.

EXCURSION TO WERRIBEE GORGE.

A PARTY of twenty-three members and friends took part in the excursion to Werribee Gorge on Monday, 23rd April (Eight Hours Day). Compartments had been reserved on the Bacchus Marsh train, so the journey was made in comfort. The day was ideal, but the country was very brown owing to the long-continued absence of rain. Motors had been engaged to take us out to the entrance of the Gorge, some five miles from the station. The road through Maddingley along the southern bank of the river was followed as far as suitable for

such traffic, thence we followed the various tracks on foot. The stream was crossed on some slippery rocks, &c., just opposite the junction of Kelly's Creek. This crossing-place, marked on the tourist map "Crossing-place when river is low," could, with a little expenditure of cement concrete, be made safer and available almost at any state of the river. The northern side of the stream, being less precipitous than the southern, affords the best opportunities for viewing the wonderful geological formations of the Gorge. After an inspection of the glacial deposits at Kelly's Creek, the party divided into two, the more active party keeping along the lower track, while the others took the upper track, agreeing to meet at the shelter shed at Picnic Point for lunch. On the way thither the magnificent view obtainable from "Full-View Point," 750 feet above the river, was greatly admired, and the geological features of the adjacent Gorge duly pointed out, while the "river" party was seen far below winding their way between the rocks and the stream. The shelter shed was reached long before any sign of the "river" party—in fact, we began to be alarmed as to their whereabouts, because we knew that at one jutting crag it was sometimes very difficult to get past, and, in addition, they would have a very strenuous climb up the hillside. However, they appeared at last, none the worse for their adventures, which had been somewhat severe. Some of the members then went on to the junction of the Myrniong Creek with the Werribee, examining on the way various exposures of Ordovician strata, glacial deposits, and other features of interest which have been recorded in previous accounts of visits to the Gorge. From near the upper shelter shed magnificent views are obtainable in several directions. This can be approached fairly closely by vehicles taking the main Ballarat road from Bacchus Marsh as far as Rose's Hill, and then turning in to the left at the guide-post.

I am indebted to Mr. A. G. Campbell, who formed one of the party, for the following non-geological report on the outing. He says:—"As far as plant life is concerned, the Gorge is an arid, unimproved defile, on whose rock-strewn slopes and cliff prominences vegetation procures but a scanty livelihood. The sparseness of the eucalyptus forest is very striking. In a bird's-eye view each tree seems to be isolated and fighting for a foothold among the rocks. Only on the spurs, where the eye looks along a thicker line, is there a forest tone. A spur sometimes means a diversity of species. On the north side will be found stringybarks and ironbarks, whilst the southern slope carries red and yellow box-trees. Near the upper shelter shed is a fine old White Ironbark, whose gnarled trunk tells only too plainly of battles with the elements. A few buds were

forming for its winter crop of flowers; two or three blossoms had already doffed their caps. There are some striking contrasts in plant life, for representatives of both the northern and southern floras are met with. On the point of the right-hand spur overlooking 'Eagle's Mirror' are two isolated, scraggy Murray Pines (Callitris), outpost of outposts, there being a well-known clump of better specimens high on the other side of the Gorge down-stream. Not far from 'View Point' is a clump of Bull Mallee, *Eucalyptus Behriana*, another visitor from the north, the trunks and tops of which are tangled with old companions—the Dodder, *Cassytha melantha*, and 'Old Man's Beard,' *Clematis microphylla*. Of anything in the nature of soil there is surprisingly little, most of the surface being covered with broken rocks of all shapes and sizes, such as might have been tumbled out of a railway cutting. The countryside has the appearance of being stricken with chronic aridity. Plant lists are all very well, but one must be excused at a time when floral organs are all too scarce and identification not rigidly correct. For a change let us look for something to admire in simple plant studies, always keeping in view that they express, in form and colour, the influence of their environment. So, while the geologists read their 'sermons in stones' with much interpolated argument, the botanists may find 'tongues in trees,' stopping awhile to glean the little story the plant is telling. A cameo picture is a salsolaceous plant, probably a Rhagodia, of grey-green colour, draping a lichen-covered rock in an upper cleft of which its twisted root has long been fixed. Those olive-coloured bushes are an Epacrid, *Brachyloma daphnoides*, but not a healthy colour for the species. They can stand a great deal of drought, but a good drink now would do them good. The Gold-dust Wattle, *Acacia acinacea*, grows in struggling tufts, which look as if they were casting about for whatever rock detritus is borne their way. Near the junction of the Myrniong Creek a fine specimen tree of *Acacia implexa*, the Sickle-leaved Lightwood, is noted, perched on a ledge of rock, drooping like a Myall, but quite at home in its arid site. High up on the hillside is a solitary Sheoke (Casuarina). Where has this tree developed its strange peculiarities, 'with leaves like wood and wood like iron'? Even the Ironbark, which imitates the Casuarina in wood and cortex, cannot withstand such hard conditions. We saw an 'old-man' Cassinia with a trunk two feet high and six inches through, bearded like a Messmate. Its leaves were dry and falling, but it may recover with the rain. Even of the flora in the Gorge, where better conditions should exist, the plant inhabitants are seen clinging among the rocks in the water in danger of being swept away when the winter floods come down.

The warm tones of *Hymenanthera banksii* and *Callistemon salignus* contrast with the lighter grey-green of *Leptospermum flavescens*, various Cyperus, Juncus, and *Arundo phragmites*. Stunted Blackwoods, *Acacia melanoxylon*, cling to the islets among the rapids, and ornament themselves with rifts of brown, curly seed-pods which are said to have saponaceous properties. On very limited flats or beds of shingle, which occur on the inside of a curve where the river swings some cliff-face, larger Blackwoods may be seen, and occasionally the white trunk of a Manna Gum, *Eucalyptus viminalis*. Very few plants or shrubs were seen in flower: the most admired of all was a Callistemon bush, whose blossoms, of an unusual pink colour, were nodding to their reflections in the stream. The brown, purse-like seed-vessels of some Bursarias were attractive. If in an empty sea-shell one may hear the 'melancholy murmur of the sea,' so in these empty purses one may listen to the whispers of the mountain breeze. Few birds were seen, the only one of note being a female Pink-breasted Robin, *Petroica rhodinogaster*, by the river, identified by her very dark brown wing-patch. Aloft, on the towering cliffs, white splashes indicated the eeries, perched on a ledge of rock, or in an undercut cave, from which Eagles have looked out for generations."

A leisurely walk back to the motors, a quick run back to the station, and train thence to town, ended an outing in which all expressed their enjoyment.—A. L. Scott.

EXCURSION TO GREEN GULLY, KEILOR.

About twenty members entrained to St. Albans on Saturday, 19th May, for the visit to Green Gully, near Keilor. Between the station and Green Gully, a distance of about two miles in a north-easterly direction, there was little to interest the field naturalist; the autumn rains had not appeared in sufficient quantity to influence the scanty vegetation. Green Gully is of particular interest to the geologist on account of the very interesting limestones which occur in the locality. As we approached Green Gully we were walking over the Newer Basalt which forms the western plains of Victoria. Passing down the slopes of the gully, we traversed a hard white quartzite about twenty-five feet thick. Then we came across a polyzoal limestone which lies in a small basin in the Older Basalt. This limestone represents fairly deep, clear, marine conditions. The fauna in the rock includes foraminifera, those minute organisms characterizing clear, moderately deep water conditions. The most prominent foram is the Lepidocycline. Polyzoal fragments are numerous, while in the more highly

iron-stained portions Lithothamnion is pronounced. From this interesting outcrop we passed down the hill to the creek, about 150 feet below, where three interesting features were noted. Firstly, the pavement caused by the denudation of the pentagonal-shaped columns of Older Basalt; a similar occurrence is to be found on the Merri Creek at Coburg. Secondly, the red ochre beds, due to the decomposition of the Older Basalt. Thirdly, a Travertine deposit containing a small Ostracod, also the Gasteropod *Coxiella striatula*, Menke, sp. It is an interesting fact that this form is absent from the living fauna in the creek, which now contains *Bythinella nigra*, thus pointing to changed conditions since the formation of the Travertine. Crossing the creek and climbing up the bank, we came across a fossiliferous ironstone, younger than the limestone noted on the opposite bank. The fossil casts, both internal and external, were well preserved, and the fauna indicated a shore-line deposit, the types found including *Haliotis naevosoides*, *Cerithium flemingtonense*, *Magellania garibaldiana*, *Lima bassi*, *Turbo*, &c. On the opposite side of the creek, in the road cutting, a similar deposit was exposed. This also yielded fossils, both Gasteropods and Bivalves. On the Keilor side of Green Gully a band of chocolate-coloured grits, which are fossiliferous, was examined. The fossils here were fragmentary. Looking down the creek towards the Maribyrnong (Saltwater) River, beautiful meanders and flood-plains were illustrated. Up the road again towards St. Albans, a quarry has been cut in the Older Basalt, showing plainly the varying stages of decomposition of the rock. Still farther up the road were exposed some coarse and finely-bedded sands. These sands were creamy in colour, with bands of red and white ochre running through them. Where these sands were finely bedded they had been quarried as a China clay or some sort of cleanser. By this time the afternoon was well advanced, and the return to the station had to be entered on, giving opportunities for a chat over our experiences.—Irene Crespin.

What is known as a "mint" copy (one as clean as if just from the printer) of Fitzgerald's "Australian Orchids" was recently sold to a Melbourne plant-lover by Messrs. Robertson and Mullen for £25.

Mr. R. S. Adamson, who recently spent some months in the study of the floras of South Australia, Victoria, and Tasmania, and, in conjunction with Professor Osborn, of Adelaide, contributed a paper, "On the Ecology of the Ooldea District," to the Royal Society of South Australia, has been appointed to the chair of Botany in the Cape Town University.

THRIPS: AN UNPOPULAR INSECT, TREATED POPULARLY.

By REGINALD KELLY.

(*Read before the Field Naturalists' Club of Victoria, 10th May, 1923.*)

IN December last Mr. Kershaw wrote to me asking me (*inter alia*) what I was doing with thrips, and would I give a paper on the subject, popularly treated, dealing, if possible, with the life-history, and giving a list of Victorian species. I replied that I was doing practically nothing in the matter just then, but would do what I could in the way he suggested.

Thrips is interesting from the etymological as well as the entomological aspect. You will notice that I use the word in the singular. It is the generic name of the typical genus given by Linnæus, and is generally used in the same form for both singular and plural. Anglicized, it is used variously and peculiarly. By some the "s" is dropped to make the plural; this seems quite a natural and euphonic practice. Others reverse this. Chapman, in a paper later mentioned, refers to the misappropriation of the name by entomologists.

This insect belongs to, or rather constitutes, the order Thysanoptera—fringe-winged insects. Earlier naturalists declared the order to consist of one family only—viz., Thripidæ—and this they divided into two sub-families—(1) Terebrantia, in which the female has an external toothed ovipositor, and (2) Tubulifera, in which the ovipositor is hidden and the tip of the abdomen is produced into an elongated tubular process. These two are now classed as sub-orders, and are divided into families—Terebrantia into Æolothripidæ, Tubulifera into Idolothripidæ and Phlœothripidæ. The American authorities, however, class all the Tubulifera in the last-named family.

Earlier writers stated that the sub-order Terebrantia included all the European species, and that nearly all the Australian species are included in the Tubulifera. I have had the satisfaction of exploding this theory, as you will notice by the subjoined lists that most of the thrips taken by me belong to the Terebrantia.

The order was synonymously named Physapoda in reference to the bladder-like foot of the insect, a structure which enables it to cling to upright objects. The present name places the order in uniformity with the other insect classification according to wing structure.

Prior to 1914 I had been doing general entomology in a desultory way in connection with botanical work. In 1912 and 1913, in company with Dr. Eland Shaw, who was working on Orthoptera, particularly Blattidæ, I gave the subject somewhat closer attention. In August, 1914, during the visit of

the European scientists, I met, amongst others, Prof. E. B. Poulton, of the Hope Museum, Oxford, who gave me two commissions—first, to make a collection of insects on a mimicry and protective coloration basis. This I did successfully, with the result that Professor Poulton wrote a very interesting paper on the collection, read at the Entomological Society, London (*vide* Proceedings, 3rd February 17th November, 1915), and the collection has been staged in the Hope Museum, and was there seen by one of my sons when on leave in 1916.

The second commission was to collect thrips for Mr. R. S. Bagnall, who had recently been appointed to the Hope Museum, and was specializing in this branch and describing thrips from all parts of the world, and was anxious to get material from Australia, then almost a virgin field. I was with Dr. Shaw when we took the new species, *Orothrips australis*, on *Xanthorrhœa australis* at Myers Creek, Healesville, in October, 1913, described by Bagnall in *Annals and Magazine of Natural History* (eighth series), vol. xiii., March, 1914. In the latter half of that year I collected seriously, and took a great number of specimens in Victoria, New South Wales, and Queensland in the latter State as far north as Townsville and out in the cane-fields near Brandon. One of the specimens so collected Bagnall named after me, and is exhibited to-night as *Physothrips Kellyanus*, Bagn.

To enable me to do serious work in the order it was necessary to get literature on the subject, and this I found most difficult, neither Uzel's monograph nor those of Halliday, Karny, or Hinds being available, and I had to scratch up my data and general information from various odd sources, and had to content myself with collecting and sending my collections to Bagnall for examination and description. This course I consider advisable, as, when one capable man is describing and is in earnest, it is best to let the work be done by him, thus saving working at cross purposes, and consequent error and confusion.

Much work has been done in the last two decades in the United States of America, and several men there describe, but they follow a uniform system, and their work has to be viséd by the Bureau of Agriculture. This, however, I fear, has a tendency to overnaming, so that every thrips in the place has a tag on it, and becomes a free-born American citizen. However, I should not be unkind in my remarks, as I have received the utmost assistance and courtesy from the Washington authorities, and they have sent me any literature I have wanted promptly and free, with assurances that I should only have to ask and receive. Certainly I promised to reciprocate with

material and data, a promise I intend to honour as soon as I have it worthily collected and collated.

During the war I sent a great deal of material to Bagnall, but evidently a lot of it was lost at sea. With the end of the war and mental reaction came apathy, and I must confess I have not since given the subject the attention it deserves, and I am afraid Bagnall must be despairing of me by now. However, Froggatt has sent him some material, quite different from mine; and I am now swamping him with further collections.

On the 28th November, 1914, the late Mr. J. Booth wrote me for information on this subject, and I gave him a *résumé* of my notes and correspondence, which he incorporated later in a paper before the Microscopical Society of Victoria. Other work done has been by Tepper and Froggatt, but, so far as I am aware, the latter has not published anything on the subject since the short reference to the order in his "Australian Insects."

In the *Argus*, Saturday, 28th December, 1918, F. Chapman contributed a popular and very interesting article, approaching the subject from the aspect of his own branch—geology—dealing with fossil thrips, and generally from text-book material, and touching on the subject of thrips' enemies and parasites. Here I would refer those interested to Bagnall's article on *Stenurothrips succineus*, gen. et sp. nov., an interesting Tertiary Thysanopteron, a fossil insect in amber (*Geological Magazine*, dec. 6, vol. i., No. 605, pp. 483–5, Nov., 1914), and to a paper by H. M. Russell, U.S.A., on "An Internal Parasite of Thysanoptera," *Thripoctenus Russelli*, Crawford (Technical Series No. 23, part ii., U.S.A. Department of Agriculture, Bureau of Entomology, 27th April, 1912), and incidentally on thrips' parasites.

In passing, I would say that I do not agree with the suggestion in Chapman's article that "one of the functions of thrips may be, in the case of roses, to check superabundant floral growth, thus saving the life of the plant during the driest weather." If it does so it is consequent only. My observations lead me to believe that Nature is essentially selfish, even in its altruism. No part of Nature acts from an unselfish motive, no matter what the result may be, except in one direction, and that is selfish in its own selflessness—viz., preservation of its own race: for this, despite attempts to preserve itself first, the individual must be sacrificed, then the species, then the genus, but last the race. Chapman's quotation that "nothing walks on aimless feet," on which he has based his suggestions, still remains a verity.

With these references, from which those who really wish

to study the order may obtain necessary information without reiteration, I will pass on to my own observations.

As the result of a number of tests, I will provisionally indicate the life-history and deal as far as possible with resultant queries. The divisions of the order are set out sufficiently for my purpose in the appended lists of Australian species.

The eggs are laid generally on the under page of the leaf of the principal food plant, sometimes inserted into the tissue, partially or wholly, sometimes just adhering to the surface around the edge of the leaf, protected by the marginal vein, and when thus placed look like a row of minute pearls, but when closely examined are found to be reniform. In this position they can be easily found on *Prostanthera lasiantha*. When inserted into the tissue they have on the leaf a somewhat similar effect to the punctures made in feeding. In the latter case, by the absorption of the chlorophyll, the spots become white, and, when many, they cause a shrinkage and curling of the leaf, sometimes total withering. By the insertion of the egg minute reniform callouses are formed, but the leaf is not so much injured, as its preservation is necessary to that of the egg, and probably forms the first food of the larva. The period of incubation is from a fortnight to three weeks, varying with temperature. In the larval stage it progresses through, at least, two moults, feeding gregariously on the more tender parts of the leaf. The larvæ of most species are white, but some are very brightly coloured—orange or crimson. Of the latter, I took many from the flowers of the American tree *Catalpa bignoniensis*, and they were probably larvæ of a species of Haplothrips. The first moult takes from three to five days from emergence, and after a like or slightly longer period the larva moults again, and enters upon its prepupal or nymph stage. The discarded skin is found often attached to the plant. As far as my observation goes, it is usually thrown off by a vertical split, vest fashion, although I have seen some moults which have been vacated at the head. There are two pupal stages which may moult differently, or the larva different from the pupa. In the prepupal stage there is movement; the pupal or later stage is more, but not altogether, quiescent, and is affected by light and other forms of irritation. The change from the prepupa to the pupa is by another moult—obvious stages of metamorphosis.

I have prepared a rough time-table of the life-history from my own observations, which I have checked with such records as I could obtain. It must be remembered that, as the hatching and subsequent processes are produced extra-corporeally, temperature and moisture have a hastening or delaying effect, and there is variation as to time in species, and particularly genera. The observations are principally on

species of Physothrips and Heliothrips, particularly Hæmorrhoidalis, a ubiquitous species, probably of American origin.

TABLE OF LIFE CYCLE.

	Days. Min.	Max.
Incubation of egg	14	21
To first larval moult	3	5
,, second larval moult	3	5
,, first pupal moult	2	3
,, second pupal moult	2	3
,, impregnation	2	2
,, gestation	1	1
	27	40

So that from deposit of egg to deposit of egg may be fixed at one month.

I have no reliable data from my own observations as to the life of an adult, but it has been variously estimated by observers, and can be taken under favourable circumstances at from 90 to 100 days, during which period it may produce eggs at the rate of five or more daily for two months. Some late adult females hibernate and produce a small brood in the early spring, and from these is produced the next summer swarm. It is apparent, then, that a mild winter and a warm, humid spring will be most productive of thrips.

I append hereto (1) a list of Australian species: (2) a list of Papuan species furnished to me by Bagnall: (3) a list of the mounted specimens exhibited by me to-night, of which the non-Australian species are shown for comparison and as links.

The study is not an easy one: exact identification and most observation must be done by microscope. There are many phases to be studied. One is the question of flight. Ordinarily these insects leap very quickly, but rarely use their beautifully-fringed wings. It is very doubtful if they can fly far: some species, indeed, are apterous. There is also the fact of parthenogenesis, which renders many investigations into life-history abortive. As these insects sometimes breed asexually, specimens of such broods under observation are sterile, and eggs infertile afford no results: time is wasted, and the observations have to be remade, with possibly like failures.

Males in many species are rare, and parthenogenesis is generally considered characteristic of the order. H. M. Russell says (Bulletin 118, Bureau of Ent., U.S.A., 1912): "The greenhouse thrips, *H. hæmorrhoidalis*, reproduces asexually *only*, the male having never been discovered." That the male has never been discovered is probably incontrovertible, but strange, as the species has been known since 1833, when it was described

by Bouché, and has been found in large numbers in most parts of the world, and is perhaps the most common species. There are two explanations of this—(*a*) the scarcity of males in most, if not all, species, their greater activity, and ability to escape when the food plant is disturbed, making the chances of capturing them remote; (*b*) they may differ so much from the female as not to have been recognized as the male of the species, as happened in the case of Blattidæ (see Eland Shaw, *Vic. Nat.*), where the male and female were described by different naturalists not only as distinct species, but widely different genera, and the missing sexes remained a puzzle until Dr. Shaw and I fortunately took several of the pairs in coition. Colour is also lent to this explanation by the fact that different species have frequently been seen feeding together—*e.g.*, *Heliothrips rubrocinctus* (discovered in 1901), of which the male is rarely taken, and *H. fasciatus* (discovered in 1805), the male whereof was wrongly described by Miss Daniels in 1904 as *Caliothrips Woodworthi*. In this species the proportion of males to females is about 25 per cent. As to the assertion that *H. hæmorrhoidalis* produces asexually *only*, Russell put this more moderately in his former Bulletin 64, part vi., where he said:—"The male has not been described, and this species is without question parthenogenetic *for many generations*." That, too, I beg leave to doubt. It bumps hard into the belief that asexually-produced generations are infertile. I refer to these matters principally to point out an interesting subject for research, and suggest as a slogan, not "Cherchez la femme," but "Cherchez l'homme." To determine sex, specimens have to be microscopically examined.

I would like to deal with some of the species exhibited, but let it suffice to call attention to that largest of all world species, *Idolothrips marginata* (*spectrum*), Hal. I found this very plentiful at Ringwood and Healesville on recently dead leaves of *Eucalyptus obliqua*, but never on any other. Also to *Limothrips cerealium*, Hal., which I captured on wheat at Sydenham. It was described by Halliday in 1852; redescribed by Hinds, 1902, and named by him *L. avenæ*—the oats thrips. It is recorded from England, Germany, the United States, and now Australia.

Bagnall is still engaged on a lot of other new material I sent him, and additional descriptions are possibly in print. I daresay Froggatt has received them as a reward for greater industry, but I hope soon to be in possession, and for that reason regret dealing with the subject prematurely, and trust that you will regard this paper as merely a preliminary survey, and subject to correction and review.

Whenever the subject of thrips has been mentioned I have almost invariably been asked how to get rid of them. That

is not my branch of the work, but of the economic entomologist. If, however, the selfish, destructive passion dominates you, I will point out a deduction to be drawn from this paper. Do not wait till the enemy is in force ; attack the few survivors holding the winter trenches. Destroy the progenitors of next year's hosts. They hide in the ground. Keep your garden clean ; expose them to cold of winter. They infest old leaves and flowers, stems and bark. Apply your cleansing remedies to these. Burn dead leaves and rubbish ; strike when the enemy is weak.

The damage done by garden and orchard thrips is principally to the pistil. The insect perforates and sucks the style, the flower shrivels, and fruit fails to set. They also attack the tender foliage, particularly that of dahlias. In investigating and determining native species I am taking records of those that are leaving the hard food of the bush for more tender and succulent cultivated plants. It will be obvious that if this takes place, as in all cases where the food supply is better and more plentiful, the species will thrive and multiply. This also applies to introduced species coming into a more congenial environment. It is quite possible that this theory may account for the number of Terebrantia in my collection. Some of them may be wide variants of introduced species.

I will be deeply indebted to anyone who can send me thrips from various localities. They should be sent in 60 per cent. spirit in small tubes, with a label enclosed giving place, date, and name of plant on which taken, written in lead pencil.

List I.

Australian Species.

ORDER THYSANOPTERA (SYN. PHYSAPODA).

Sub-Order Terebrantia.

Family Æolothripidæ.

Orothrips propinquus, Bagnall.
,, australis, Bagnall.
,, tenuicornis, Bagnall.
Cranothrips Poultoni, Bagnall.

Family Thripidæ.

Limothrips cerealium, Hal.
Odontothrips fasciatipennis, Bagnall.
,, australis, Bagnall.
,, bispinosus, Bagnall.
Physothrips cinctipennis, Bagnall.
,, Kellyanus, Bagnall.
,, brevicornis, Bagnall.
,, seticollis, Bagnall.
,, setipennis, Bagnall.
Pseudothrips parvus, Bagnall.

Pseudothrips achætus, Bagnall.
Heliothrips hæmorrhoidalis, Bouché.
,, frontalis, Bagnall.
Australothrips bicolor, Bagnall.
Isoneurothrips australis, Bagnall.

Sub-Order Tubulifera.
Family Idolothripidæ.

Mecynothrips Wallacei, Bagnall.
Idolothrips marginata, Hal. (Spectrum.)

Family Phlœothripidæ.

Eurynothrips denticollis, Bagnall.
,, magnicollis, Bagnall.
Kladothrips rugosus, Froggatt.
Horristiothrips australis, Froggatt.
Pygothrips australis, Hood
Rhopalothrips Froggatti, Bagnall.
,, brunneus, Bagnall.
Œdemothrips propinquus, Bagnall.
Haplothrips victoriensis, Bagnall.
,, melanoceratus, Bagnall.
,, robustus, Bagnall.
Cryptothrips Shavianus, Bagnall.

List II.

Papuan Thrips.

(By favour R. S. Bagnall.)

Terebrantia (small flower species).

Selenothrips decolor, Karny, from Cacao.
Heliothrips longiceps, Karny.
,, globiceps, Karny.
,, Aulmanni, Karny, from Cacao.
Euthrips flavicinctus, Karny.
Franklinella tenuicornis, Uzel.
} ½ to 2 mm. long.

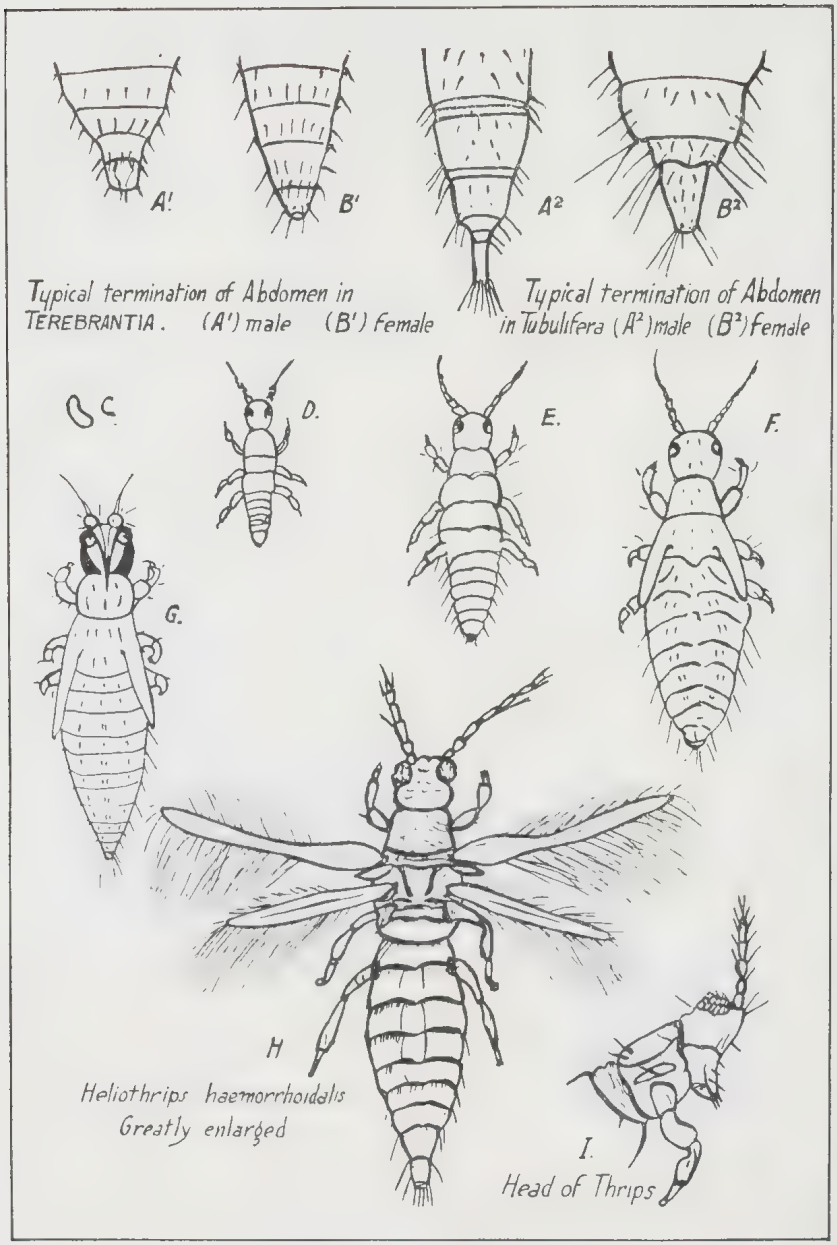
Tubulifera (usually large).

Mecynothrips Wallacei, Bagnall, 14 mm. long.
Dimothrips Sumatrensis, Bagnall.
Macrothrips Papuensis, Bagnall.
,, intermedius, Bagnall.
,, dubius, Bagnall.
Machatothrips biuncinata, Bagnall.
} All large and massive.

Ecacanthothrips sanguineus, Bagnall.
,, crassiceps, K.
Orinothrips inervis, Buffa.
Liothrips gigas, K.
Phlœthrips spinipes, Bagnall.
} Moderately large.

Tricothrips papua, K.
Hinderania brevitulens.
Haplothrips microphthalmus, K.
} About 2 to 5 mm. long.

PLATE IV.



METAMORPHOSIS OF THRIPS.

List III.

Slides Exhibited.

1.—*Cranothrips Poultoni*, B., ♀, collected by E. B. Poulton on flowers at Fremantle, W.A. (co-type).

2.—*Limothrips cerealium*, Hal., ♂, collected by R. K. on wheat at Sydenham.

3.—*Limothrips cerealium*, Hal., ♀, collected by R. K. on wheat at Sydenham.

4.—*Odontothrips fasciatipennis*, B., ♀♀, collected by E. B. Poulton on Mesembryanthemum at Outer Harbour, S.A. (co-types).

5.—*O. australis*, B., ♀♀, collected by E. B. Poulton on papilionaceous flowers at Mundaring Weir, W.A. (co-types).

6.—*Physothrips cinctipennis*, B., ♀♀, collected by R. K. on small pea-flowers at Brandon, N.Q. (co-types).

7.—*P. Kellyanus*, B., ♀♀, collected by R. K. in Brisbane Botanical Gardens (co-types).

8.—*P. brevicornis*, B., ♀♀, ♂♂, collected by R. K. on Helianthus at Healesville, Victoria.

9.—*P. setipennis*, B., collected by R. K. at Healesville.

10.—*P. usitatus*, B., ♀, Pusa, Bengal, India, closely allied to *P. cinctipennis*, B.

11.—*Pseudothrips parvus*, B., ♀, collected by R. K. at Brandon, Q., on Helianthus (co-type).

12.—*P. achatus*, B., ♀♀, collected by E. B. Poulton at Mount Lofty, S.A. (co-types).

13.—*Heliothrips hæmorrhoidalis*, Bouché, ♀, collected by R. K. at Healesville, Vic., on *Eucalyptus viminalis* (gum-leaves).

14.—*Australothrips bicolor*, B., ♀♀, ♂♂, collected by R. K. at Healesville on *Eucalyptus viminalis* (co-types).

15.—*Isoneurothrips australis*, B., ♀, collected by E. B. Poulton on flowers of *Acacia pulchella* at Cottesloe Beach, Fremantle, W.A.

16.—*Idolothrips marginata*, Hal., ♀, collected by R. K. (see text).

17.—*Idolothrips marginata*, Hal., ♂, (spectrum) (*vide* text).

18.—*Haplothrips victoriensis*, B., ♀, collected by R. K. at Healesville, Vic., on *Acacia decurrens*, var. *mollissima* (co-type).

19.—*Thrips japonicus*, B., collected by J. A. E. Lewis at Kobe, Japan (co-type). This is exhibited as a beautiful specimen and as an example of the typical genus.

Explanation of Plate.

C Egg.
D Larva, early stage.
E „ later stage.
F Prepupa.
G Pupa.

All greatly enlarged.

Note.—In *H* the left antenna should have been drawn with 5 joints and 6 segments, as in the right antenna. *I* Adapted from Moulton.

THE MOLOCH LIZARD, *MOLOCH HORRIDUS*, Gray.

This most extraordinary lizard is found only in Western Australia and parts of South Australia. It belongs to the family Agamidæ, which includes so many of our typical Australian lizards. The Moloch reminds one of the curious little lizard, *Phrynosoma cornutum*, or "Californian Toad," as it is commonly called, but the latter lizard differs from the Moloch in the position of its teeth, these being pleurodont—that is, in having the teeth attached to the inner side of the parapet of the jaws instead of having them attached to the summits of the jaws, as in the acrodont type, to which group the Moloch belongs; so that, although from an external appearance the Phrynosoma appears very much like an agamid lizard, its proper place is in the Iguanidæ, which family has no representative in Australia.

Some notes on a pair of Molochs which I received on the 12th of September last year from Mr. J. Clark, the well-known entomologist of Perth, W.A., may be of interest. These—a male and female—came by post enclosed in a small, close-fitting tin box, the Molochs being hardly alive on arrival. This was not surprising, as in a letter received from Mr. Clark about the same time it was stated that the Molochs were captured at Mundi-Windi, in North-West Australia, on the 26th August, and had afterwards travelled 200 miles by camel, followed by a motor trip, arriving at Perth on 6th September, reaching me on the 12th of the same month. So that, considering they were enclosed in a tight-fitting tin box, which was also securely wrapped in brown paper, they must have existed for all this period on the small amount of air contained in the box, the dimensions of which was 9 inches by 4 inches by 1½ inches. During the next day, the 13th September, the lizards had somewhat recovered from the partial suffocation they had undergone, but the next difficulty was to feed them. Having already heard that these lizards feed chiefly upon ants, and, as could easily be seen, the Molochs were becoming thin owing to the lack of feed and drink, yet it was all of no avail that I collected white ants for them, as the lizards would not even look at these. Previously, I was under the impression that white ants would prove irresistible to insect-eating lizards, but, as the Molochs refused to have anything to do with these insects, ants of various genera and species were collected for them, some of which were as follows: *Iridomyrmex detectus*, *Iridomyrmex nitidus*, *Ectatomma metallicum*, *Monomorium pharaonis*, *Polyrachis semi-aurata*, *Camponotus nigriceps*, and a species of Pheidole, but the Molochs would have none of them. The lizards were by this time becoming thin, as could plainly be seen by their tails, which, by the way, is always a guide to

the condition of reptiles, no matter whether these are lizards, snakes, tortoises, or crocodiles.

On the 19th October a small, thin line of the small, evil-smelling black ant, *Iridomyrmex rufoniger*, var. *domesticus*, Forel, was noticed, the individuals of which were either coming or going to a feast furnished by the remains of a crushed garden snail; so, as a last resource, the Molochs were placed on the ground facing the line of ants, and to my surprise commenced feeding rapidly upon these small but bad tasting and smelling creatures. Since that time they have eaten many thousands of this ant. The strange taste of the Molochs in selecting this ant and avoiding those of other species which might easily be thought to be much better eating came as a surprise. The size of the ant in this instance had nothing to do with it, as they absolutely refuse to eat ants that are either a little larger or smaller than this species.

The number of ants consumed at a meal is astonishing. Each ant is taken up by means of flipping out the tongue, to which the ant adheres in the same manner as the chameleon takes its food. The average number of ants consumed per minute by a Moloch is forty-five, providing that the day is hot and ants are plentiful, so that for a meal lasting for fifteen minutes (which is about the usual time they take in which to fill themselves), gives a total of 675 ants. This, at only two meals per day, gives 1,350 ants per Moloch, or, for both of them, 2,700 ants per day.

It was remarkable that on some days, when the ants were busily engaged in carrying their pupæ, that when such ants were taken by a Moloch they invariably dropped the pupa they were carrying, so that in the space of a few minutes the latter formed a small heap about 2 inches distant in front of the Moloch's head, this being the distance the pupæ were thrown by the force of the impact of the lizard's tongue, when the ants released their hold of the pupæ.

Only on one occasion were the Molochs observed drinking, and this was accomplished by flicking out the tongue on to grass that had been recently hosed, so that the mode of drinking was like that of the chameleon.

Molochs are usually found living in dry, sandy wastes of Australia where water is absent or very nearly so; at any rate, they appear to have no idea of direct drinking otherwise than by flicking out the tongue. Another most remarkable thing is the hygroscopic nature of their skin, which absorbs moisture almost as readily as blotting paper. For animals living in desert areas this is a most useful provision of Nature, as it allows the creature to obtain all the moisture it requires from

dew, or even by coming into contact with dewy herbage. If one of these lizards be placed in a saucer that contains a small amount of water, the latter can be seen ascending the skin, until in a short space of time the animal has quite a saturated appearance, even to the top of its head.

In captivity Molochs retire for the night very early, and have a most peculiar habit of burying their head in sand; probably it is for this reason that their nostrils have apparently no direct opening that I can discover, even with the aid of a magnifying glass. It is also probably due to this peculiar trait of burying the head in sand that there is no external opening to the ear. The absence of an opening to the ear reminds one of our White-streaked Earless Lizard, *Tympanocryptis lineata*, Peters, formerly so plentiful on the plains between here and Geelong.

Molochs are remarkably early risers for land reptiles; probably this early rising is to obtain moisture before the heat of the day evaporates any dew that may be present. These lizards, although still in perfect health, have shown no signs yet of skin-shedding, and, although there are many reptiles that do not shed their skins, I know of no lizard that does not, so possibly skin-shedding with this lizard is not of frequent occurrence.

Molochs have the power of changing colour to a very remarkable degree, and, again, like the chameleon, it is mostly due to the influence of light and heat that causes the change to take place. During hot, bright days Molochs become quite gaily coloured in yellow and red, but on being removed to a cool and shady place they become darker, and at night are decidedly dark in colour.

These lizards are most docile, this being due, in my opinion, to stupidity combined with vigorous appetites, for if a line of ants is ascending a tree-trunk you have only to hold one of these lizards up to the ants, when it will lick them up just as freely as if it was placed on the ground.

The prolonged warm spell of weather we have been having is all in favour of keeping these lizards in good health, but I much doubt their ability to live through a Victorian winter, which must be very long when compared with that of North-West Australia, where there is hardly any winter at all. They have already been in captivity over eight months.

In walking, these lizards carry the tail in an almost perpendicular position, giving them a most comical aspect. Their quaint ways and great docility make them most charming little pets, in addition to which they are the most extraordinary of all our Australian reptiles.—H. W. Davey, F.E.S.

CHARLES J. GABRIEL
BEQUEST
Rec'd 29 Aug. 1963

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The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria.

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Hon. Editor: F. G. A. BARNARD, Esq.

The Author of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 13th AUGUST, 1923.

1. Correspondence and Reports.

2. Election of Members.

As Ordinary Member—	Proposer.	Seconder.
Miss Jude, 13 Dickens-street, St. Kilda.	Mrs. Shiels.	Miss Nethercote.

3. Nominations for Membership.

4. General Business.

5. Remarks by Exhibitors relative to their Specimens.

   Ten minutes' adjournment for discussion of Exhibits.

6. Reading of Papers and Discussion thereon.

   By Dr. C. S. Sutton—"Cradle Mountain, Tasmania, and its Vegetation." (Illustrated by lantern views.)

7. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

   Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and *Naturalist*. Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Club year ended on 30th April last. Any subscriptions overdue should be forwarded to the Hon. Treasurer *at once*.

Subscriptions for 1923-4 are now due, and should be paid to the Hon. Treasurer as early as possible.

EXHIBITION OF WILD-FLOWERS.

Members are desired to note that the above Exhibition will be held in the Melbourne Town Hall on **Wednesday, 3rd October,** and to communicate with friends in the country with regard to exhibits.

The Victorian Naturalist.

Vol. XL.—No. 4. AUGUST 9, 1923. No. 476.

FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 9th July, 1923.

The president, Mr. C. Daley, B.A., F.L.S., occupied the chair, and about fifty members and visitors were present.

The president said that since the last meeting another member of the Club had passed away after a long and serious illness. Though Mr. J. Cronin had not been a frequent attendant at the Club meetings, he had in many ways shown his interest in the Club. He moved that a letter of sympathy be sent to his widow and family. This was seconded by Mr. F. G. A. Barnard and carried in silence, all standing.

REPORTS.

A report of the visit to the National Museum on Saturday, 18th June, was given by Mr. F. Chapman, A.L.S., palæontologist to the Museum, who acted as leader on the occasion. He said that the afternoon had been devoted to the fossil galleries. There a large number of fossils and casts of extinct monsters were inspected, and their relationships to present-day animals pointed out. Opportunity was also taken to examine under the microscope foraminifera, &c., brought from the Antarctic by the Shackleton and Mawson expeditions, also foraminiferal limestone from Papua.

A report of the visit to the National Herbarium on Saturday, 30th June, was, in the absence of the leaders (Messrs. J. W. Audas, F.L.S., and P. F. Morris), given by the chairman, who said that a party of about twenty members had spent a very interesting afternoon at the Herbarium, where they had been shown some very rare and historic specimens and books. The Herbarium ranks among the leading ones of the world, and the facilities for reference to its contents were fully demonstrated.

Owing to the wet weather the excursion arranged for Ringwood on Saturday, 7th inst., was abandoned.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Stella Lambert, Malvern-grove, Malvern; Sister Ethel Forsyth, Repatriation Hospital, Caulfield; Mr. Ian Macgillivray, Ormond College, Parkville; and Mr. David Newmarsh, 108 Heidelberg-road, Ivanhoe, were duly elected as ordinary members of the Club.

GENERAL BUSINESS.

Mr. E. Cox said that the Piscatorial Council of Victoria,

representing the various angling clubs, was desirous that a fish culturalist should be appointed by the Government with the view of thoroughly studying the habits of our native fish and endeavouring to promote the breeding of the more useful of them. He moved—"That this Club support the action of the Piscatorial Council in its endeavours to have a fish culturalist appointed, and to encourage the increase of the indigenous fishes." This was seconded by Mr. H. Whitmore.

Mr. H. W. Davey, F.E.S., said that great care should be exercised in the selection of the fishes to be cultivated. It was absurd and injurious to breed imported fishes when some of the indigenous species were far better as food fishes and were not so destructive to other inhabitants of the streams as those which had already been introduced. Mr. J. L. Robertson urged that some attention should be paid to marine fish, for, without a supply of sea fish, there would be no fishermen from whom to get recruits for the navy and mercantile marine service.

PAPER READ.

By Mr. A. N. Lewis, entitled "The Effect of the Ice Age on Tasmanian Topography."

The author, by means of a large series of excellent lantern slides, showed the effect of ice in changing the topography of a country. Tasmania had probably experienced two or three ice ages, and in the western and south-western portions had been severely carved by their agency. He pointed out the differences between the action of ice and that of water, the former giving a concave outline to the mountain, while the results of water were more or less convex.

Messrs. C. Daley, A. L. Scott, A. S. Keep, J. H. Harvey, and F. Chapman, A.L.S., took part in an interesting discussion which followed.

EXHIBITS.

By Mr. F. G. A. Barnard.—Flowering branches of *Acacia elongata*, Long-podded Wattle, N.S.W., grown at Kew.

By Mr. G. Coghill.—Collection of shells, native weapons, and ornaments, &c., from Papua.

By Mr. C. French, jun. A remarkable gall-making coccid (scale insect), *Apiomorpha fletcheri*, ♂, ♀, first time exhibited in Victoria, collected at Mooroolbark, Victoria, by C. French, jun., and C. L. Plumridge; specimens of *Plagianthus glomeratus*, Clustered Plagianth, from Altona Bay (usually found in the Mallee).

By Mr. H. W. Davey, F.E.S.—Case of Coleoptera, showing the three sub-families of Cerambycidæ—viz., Prionides, Cerambycides, and Lamiides.

By Mr. E. E. Pescott, F.L.S. (*a*) An aboriginal stone axe, showing very regular rectangular fractures on the unground surface; (*b*) a unique stone "mill," very small, having side grooves, indicating the possibility of its secondary use as a "sinker" - both from Western District, Victoria; flowers from cultivated plants of *Thryptomene Mitchelliana*, F. v. M., *Correa speciosa*, Andrews, foliage of *Kochia tedifolia*, F. v. M., and flowers of *Narcissus pachybolbos*, a native Narcissus, from Algiers.

By Geological Survey, per Mr. A. E. Rodda. Turquoise in slate and quartz, from North-Eastern district of Victoria.

By Mr. J. Searle. — Foraminifera from sands from New Hebrides.

After the usual conversazione the meeting terminated.

EXCURSION TO THE NATIONAL MUSEUM.

A PARTY of twenty-five members and friends visited the fossil galleries at the Museum on Saturday afternoon, 16th June. The beautifully-finished disarticulated skull of the Indian Elephant in the zoological portion (one of the last pieces of work by the late Mr. T. F. Moore) was pointed out in relation to those of the fossil specimens seen later upstairs; this shows the parallel-ridged type of tooth seen in the Mammoth, and also in the fossil Indian elephants. As an introduction to the remarks on fossil examples in the gallery upstairs, a summary of the sequence of strata was given in front of the Table of Strata hung on wall. Interest was shown in the tracing of progressive stages in the groups of the elephants and the cetacea, and these, as well as aberrant types of the higher vertebrates, were pointed out in the fine series of fossil remains exhibited in the wall cases. The casts representing the group of the beaked lizards (*Rhynocephalia*) were examined, and the comparatively large size of the Karoo specimens (*Mesosaurus*) were remarked upon. Amongst the many interesting modifications of the reptilian form were seen the fish lizards (*Ichthyosaurus*), with their porpoise-like outline and paddle-shaped limbs, and the flying reptiles (*Pterosauria*), ranging from the size of a sparrow (*Pterodactylus*) to the giant *Pteranodon* of the Cretaceous of Kansas, which had an expanse of 29 feet. The foreshadowing of several types of mammalian dentition was noticed in the curious anomodont reptiles, as *Dicynodon* and *Tritylodon*. The history of fishes provides one of the most fascinating stories of the variations of a phylum in adapting itself to conditions of life and habits, each being interdependent and reflected in their curious shapes and internal structures. The earliest fishes were undoubtedly scaleless and slimy, but

they gradually made use of the excretory lime constituent to build up an armature of scales or plates; whilst the earliest mouth armature, used for procuring food, seems to have originated from the same scaly covering around the mouth. Early sharks had their teeth fused on the jaw, whilst most modern types have them embedded in cartilage and easily shed when worn. One genus, in Carboniferous times (*Helicoprion*), which was related to the common "Gummy," had its teeth coiled up as they went out of action. The extremes of form in the herbivorous group of the Edentates were seen in the Giant Sloth, evidently covered with rough hair, and the *Glyptodon*, with its thick encasement of a bony cuirass. A new addition to the collection, *Spirulirostra*, given by a Club member, formed the subject of some remarks on the variants in shape of some living and extinct cuttle-bones. After examining the scale and tooth of *Metaceratodus*, or Mud-fish, from the Jurassic of the Kilcunda district, as well as the claw of the unique Dinosaur from the same district, the members were asked to inspect a few specimens and types of structure in the palæontological office, the microscope being used to show the foraminiferal deposits from the Shackleton and Mawson expeditions, and also some of the fossiliferous limestones of the oil country in Papua. From the number of questions put to the leader from time to time—some of them "posers"—it is safe to say that a few of the members, at least, considered the afternoon not unprofitably spent.—F. Chapman.

The Late Mr. J. Cronin.—We regret to record the death of Mr. J. Cronin, F.R.H.S., Director of the Melbourne Botanic Gardens, on Saturday, 30th June. He had been in ill-health for a considerable time, and, though at times thought to be recovering, at last succumbed to a serious malady. He was elected a member of the Club in December, 1910, but, owing to official and other engagements, was seldom able to attend its meetings. He was an enthusiastic horticulturist, and had devoted considerable attention to hybridizing and improving garden flowers, such as dahlias, Watsonias, &c. In 1908 he succeeded Mr. W. B. Luffman as principal of the School of Horticulture, Burnley, and during the next year followed Mr. W. R. Guilfoyle as Director of the Botanic Gardens. His artistic tastes and judgment were often sought by corporations and others in laying out new parks and reserves, and in that way will be a distinct loss to the State. He encouraged the cultivation of indigenous plants and shrubs, and exercised considerable skill in their treatment.

THE AQUATIC PROTOZOA OF THE MELBOURNE DISTRICT.

PART I.

BY JOHN STICKLAND.

(*Read before the Field Naturalists' Club of Victoria, 9th April*, 1923.)

IT may be well to state, by way of preface, that the subject-matter of this paper is laid before you this evening with the hope that it may be of sufficient interest to induce some of the members to join the very thin ranks of the Club's students of aquatic life.

Field naturalists, it may be said with some approximation to the truth, have the world for their field, for, go wherever they may, something of interest will be found; rocks, plants, birds, insects arouse interest and admiration. All these objects are so much in evidence that they arrest and almost monopolize the attention of the majority of nature-students, and this, I think, accounts for what seems to me the limited amount of attention bestowed upon aquatic organisms in general. Yet how rich are the "watery wastes" in objects worthy of consideration—objects strange and wonderful, often very beautiful, and, for the most part, very unlike terrestrial forms! Passing over the beautiful aquatic flora and the larger fauna, of which we know practically nothing, it may be pointed out, in the first place, that almost every order of insects is represented amongst the denizens of the water in some or every stage of development, not excepting even the Lepidoptera. How strange and interesting their larval forms, and how wonderful their metamorphoses!

Here, among many others, we have the remarkable larva of the ephemera, with its tracheal gills arranged like rows of fans along its sides, spending, it may be, two years in its juvenile stages, and enjoying but a few hours of adult life. Tennyson, in his "Two Voices," describes the metamorphosis of the dragon-fly so vividly that, without vouching for his absolute scientific correctness, I venture to quote his words—

> "To-day I saw a dragon-fly
> Come from the wells where he did lie.
>
> "An inner impulse rent the veil
> Of his old husk; from head to tail
> Came out clear plates of sapphire mail.
>
> "He dried his wings; like gauze they grew.
> O'er croft and meadow wet with dew—
> A living flash of light—he flew."

The Arachnidæ, the class containing spiders, also supplies its contribution to the inhabitants of the pond in the shape

of spiders, mites, and the strange "water-bear," Macrobiotus, which withstands desiccation so completely as to leave it a shapeless particle of matter, which, however, exhibits a perfect resurrection when conditions become favourable. Worms of various kinds are to be found, and pass, as far as we know, practically unnoticed. And what of the wonders of the sea—the Hydrozoa, with their marvellous alternation of generations, Polyzoa, and other forms too numerous to mention?

It is not my intention to say anything further concerning these (for the most part) macroscopic forms of life, but to bring under your notice a still more neglected group—the Protozoa. Other members of the Club have at rare intervals read papers dealing with rotifers and minute crustaceans, but I do not remember any dissertation on the subject of aquatic or other Protozoa forming part of the evening's business for a great many years. This may be the fault of the "pond-lifers" themselves; hence I venture to attempt to supply the deficiency now. The subject mentioned in the title of this paper is so large that I propose to divide it into two parts, and on this occasion give some description of what the Protozoa are, glance at their physiology, and describe a few forms in the lowest group, and at some future time, if it be thought desirable, to deal with the higher forms.

In answer to a supposed question as to what the Protozoa are, it may be stated, in the first place, that they are unicellular animals, and I particularly wish members to bear this in mind in order that they may realize how wonderfully modifications of parts of this single cell enable a protozoan to perform nearly all the vital functions noted in the case of highly-organized creatures. Perhaps a few words in explanation of what a cell is may not be out of place. A cell is a particle of protoplasm. In vegetable cells we find a definite enclosing envelope the cell wall; in animal cells this is practically non-existent. The protoplasm of the cell, apart from the nucleus, is usually spoken of as the cytoplasm, and will be so designated in what follows. Within this cytoplasm is a specialized portion known as the nucleus, which is of vital importance. When viewed under the microscope with proper manipulation, both cytoplasm and nucleus in general present a reticular appearance. In addition to the nucleus, the infusorian cell is furnished with a micro-nucleus. The interstices in the network mentioned are filled with fluids the cell sap and nuclear sap. The nucleus seems to be intimately connected with the nutrition of the cell, and the micro-nucleus (when present) with reproduction.

In the Metazoa, or many-celled animals, which group includes all the higher forms, the cells are differentiated and formed into tissues for the performance of necessary vital functions, while,

as mentioned before, this end is attained by a single cell in the case of the Protozoa—nutrition, locomotion (in many cases), and reproduction all are accomplished. A protozoan is thus a decidedly self-contained cell. Now, it must not be forgotten that Protozoa are not the only unicellular organisms, for there are innumerable plants coming under the same designation, such as desmids, diatoms, &c. This being the case, the question may be asked, What is the difference between the Protophyta and Protozoa? It is practically impossible to draw a clear line of demarcation between the two. It might be thought that the power of locomotion would be characteristic of animals only, but this is certainly not the case. On one occasion I collected some alga of a filamentous type in a gutter in the Treasury Gardens, and when examining it under the microscope was delighted to see the discharge of motile spores (zoospores) from some of the cells. These spores swam away rapidly by the aid of flagella.

The fact that the nutrition of the organism is holophytic—that is, after the manner of plants (owing to the presence of chlorophyll, or holozoic, or animal-like (that is, living upon organic matter) does not settle the question. Haeckel constituted an order (the Protisten-reich, or Protistan kingdom) for the reception of all these low forms, but it does not appear to be generally adopted.

In all animals nutrition is a prime necessity; hence the question arises, How is food taken in (or ingested, as it is termed) in such rudimentary forms? Various methods are adopted. In the case of the Sarcodina there is no mouth or anything of the kind. An Amœba, which is of the consistence of a somewhat liquid jelly, accomplishes this object by simply flowing round and engulfing its prey. Having digested its capture, it may get rid of any useless remainder by simply flowing away from it, thus exactly reversing the operation of ingestion. Another form, Actinosphærium, is possessed of long, thread-like extensions of its cytoplasm, projecting in every direction. Having laid hold of a rotifer, say, by means of these "pseudopodia," it gradually retracts those in possession of the captive, sending out, in the meantime, further portions of its cytoplasm until the unfortunate victim is completely surrounded and then drawn into the interior of its captor and digested. One such operation which I watched must have taken from twenty minutes to half an hour to complete, not including the digestion spoken of. In many flagellate and ciliate forms there is a definite opening in one part of the cell through which food matter passes into the interior.

The process of ingestion can be exceedingly well observed in the Vorticellæ or Bell Animalcules. These creatures have

a well-defined pharynx beyond the oral aperture. The food matter is gathered by the action of cilia and collects at the end of the pharynx. When sufficient has accumulated a food vacuole is formed, which encloses a small quantity of water in addition to the food, the whole passing into the interior of the cell, and, moving round in the cytoplasm, digestion is accomplished. Several of these food vacuoles can be seen within the animal at one time. Any unassimilated residue is discharged through an anal aperture into the pharynx. Another type of ingestion is to be seen in the case of the suctorian forms, such as Acineta. The long tentacle-like appendages with which the animal is provided hold any minute creature which comes in contact with them fast. Concentrating several of the organellæ upon its prize, it sucks out the more fluid portion of its victim, which passes down the tentacles into the captor.

Digestion in the Protozoa is intracellular—that is, it takes place within the cell, the cytoplasm containing the necessary enzymes or ferments; thus a stomach, with its gastric juices, is dispensed with. A person observing a protozoon steadily for some little time would probably note a small clear space or vesicle gradually forming within the cytoplasm, and growing in size until it suddenly disappeared. This is known as the contractile vacuole, and performs a very important part in the animal's economy. It serves as an excretory organ, and takes part also in the process of respiration. Along with the food in the food vacuoles, and in other ways, water enters the cytoplasm, and, as this water contains air, the necessary oxygenation of the cell is accomplished. The carbon dioxide and other products of metabolism in the animal collect in the contractile vacuole, which finally discharges its contents outside the cell, which accounts for its temporary disappearance. In this way both respiration and excretion are provided for.

Locomotion in the Protozoa is accomplished in various ways. In the case of Amœba it consists in a peculiar sort of flowing of the whole cytoplasm, no locomotor organellæ existing. The testaceous Rhizopods extend protoplasmic processes, or pseudopodia, by means of which they creep along. In the flagellate forms pseudopodia are dispensed with, and replaced by one or more whip-like organellæ—flagella—by the motion of which the animals are drawn along. The Infusoria or Ciliates possess much smaller hair-like appendages in great numbers, as a rule, by the rhythmic waving of which locomotion is effected. In some of the Infusoria the cilia on the ventral surface are joined together into "cirri," comparatively stout organellæ, by means of which the animals walk in a most

unmistakable manner. In very many cases the locomotor organellæ are used also for the capture of food.

In the methods by which reproduction is accomplished there is much of interest to the observer. When the cell is fully grown, cell division commences. The nucleus first exhibits the phenomenon known as mitosis, or karyokinesis, which in many Protozoa is less elaborate than in the Metazoan cell. This being completed, the cell separates into two. This action is known as "fission." Fission may be either longitudinal (as in the case of Vorticella) or transverse (as in Stentor). A reconstituted nucleus goes into each half of the dividing cell: thus two new animals are formed. It is impossible to distinguish between parent and offspring here—in short, a sort of immortality exists. Careful experiments have proved that fission may continue to take place almost indefinitely under favourable conditions. In such an experiment a single individual is isolated after each division and placed in a nutrient medium. Such favourable environment does not always exist under natural conditions, if ever, so a sort of senile decay sets in after a number of fissions as described. But these lowly organisms have discovered a way to renew their youth. This is brought about by what is known in a general way as conjugation. Conjugation may be of two similar individuals, when it is known as isogamy; or one conjugant may differ from the other, when the operation is called anisogamy. When conjugating, two animals unite, and an interchange of nuclear matter takes place. Two new nuclei are formed—in the case of the Infusoria from the micro-nuclei—and the conjugants separating, each provided with a new nucleus, are rejuvenated. Conjugation is not always of this temporary kind. In the case of Vorticella, for instance, a zooid breaks up into small gametes, one of which, coming into contact with an animal of the ordinary size, attaches itself to it and is completely absorbed. The small or active gamete is regarded as the male. Encystment and spore-formation occurs amongst the Protozoa. An animal contracts, surrounds itself with a hardened envelope, and breaks up into spore-like bodies, which escape from the cyst and eventually develop into forms like the parent.

Protozoa are very differently classified by authorities, but the following classes are very generally recognized — viz., Sarcodina, which consists of forms furnished with or capable of protruding either lobose or thread-like pseudopodia; Mastigophora, Protozoa having one or more whip-like organellæ; Sporozoa and Hæmoflagellates, internal parasites, many of which are pathogenic or disease-producing organisms; and Infusoria, comprising forms bearing cilia in some or all stages of their existence. The Sporozoa and Hæmoflagellates

not being aquatic in their habits, are outside the scope of this paper.

The class Sarcodina may be subdivided, according to Minchin, into two sub-classes, Rhizopoda and Actinopoda. The first of these, Rhizopoda, contains four very distinct orders, with two of which -Amœbœa and Foraminifera -I propose to deal. Amœbœa is again divisible into sub-orders, with the second of which Lobosa we are interested. Lobosa falls very naturally into two sections -Nuda, or naked forms, and Testacea, animals secreting a test or shell. Many of the Lobosa type are to be found amongst plants or in the sediment at the bottom of shallow pools of long standing ; hence they are sometimes called sapropelic, or limicolous or mud-inhabiting organisms.

I will commence the description of a few representative forms of Rhizopoda with Amœba, which is well known by repute to all students of biology, but is, I think, rarely seen. It is so very variable in shape that its identification is a matter of considerable difficulty. It is an absolutely microscopic speck of naked protoplasm of a somewhat liquid consistence, as before stated. The ectoplasm or outward part is stiffened, in a measure, by contact with the water by which it is surrounded. This outer film seems to give way, and some of the protoplasm streams out in a blunt outflow ; all the remainder may follow, or it may reverse and flow out again in quite a different direction. Should it go straight on, however, its progress is exceedingly slow. Several species, probably, are to be taken in our ponds. Of these we have been able to identify with something like certainty *Amœba proteus*, Leidy, and a somewhat star-like form called *Dactylosphærium* (*Amœba*) *radiosum*, Bütschli.

The group Testacea has more numerous representatives, one of the most common genera being Difflugia, Leclerc. These animals construct their domiciles of sand grains as a rule, in shape spherical, oval, or pyriform. The test is open at one end, and through this opening blunt pseudopodia are protruded at pleasure. Quite a number of species have been included in our takings from time to time, of which *D. corona*, Wallich, is perhaps the most ornate. The test of this form, as indicated by its name, is surrounded at the fundus (or end opposite the mouth) by a variable number of blunt spines, which give it the shape of a coronet. Centropyxis, Stein, is another Rhizopod which constructs a test of sand grains. In shape it is much flatter than Difflugia. *C. aculeata*, Ehr., is the species most common. It has a varying number of blunt spines projecting from the edge of the test. A variety without spines, named *ecornis*, Leidy, is not so common.

Arcella, Ehr., is a form bearing considerable resemblance

to *Centropyxis ecornis* in shape. The test, however, is chitinous, and covered all over with dot-like markings in many cases. In colour it varies from rich brown to pale yellow in the younger specimens. Arcella, like some other Rhizopods with tests, can form gas bubbles within its cytoplasm, and thus alter its specific gravity, enabling it to rise or fall in the water. *A. vulgaris*, varieties *gibbosa*, G. S. West, and *angulosa*, Leidy, are the prettiest of the fairly numerous species obtainable. Reproduction by budding is frequent with Arcellids. Euglypha, Duj., is not so common as the before-mentioned forms. It is interesting not only by reason of the beauty of its test, but also from the fact that this test is constructed of chitinous plates formed within the cytoplasm and transferred to the surface.

Lesquereusea spiralis, Schlumb., constructs a handsome test of vermiform pellets, but unfortunately is somewhat rare, as is also Trinema, the test of which is so much bent that the mouth opening appears to be in the side when viewed on that surface.

Unfortunately, we have not come across any ponds near Melbourne containing Sphagnum, and many genera of the Rhizopoda which are partial to this moss as their habitat have never come under our notice; and of the few other places rich in these forms most have passed out of existence or are no longer available.

The Foraminifera constitute the second order of the Rhizopoda, and are characterized by the formation of shells, in most cases pierced with minute holes, through which fine, thread-like pseudopodia are extended. They are, almost without exception, marine, and it has not been our good fortune to take any living specimens. The empty shells of *Polystomella crispa* may be found in the ripple-marks on sand-banks left by the retiring tide at Black Rock and doubtless many other of our beaches.

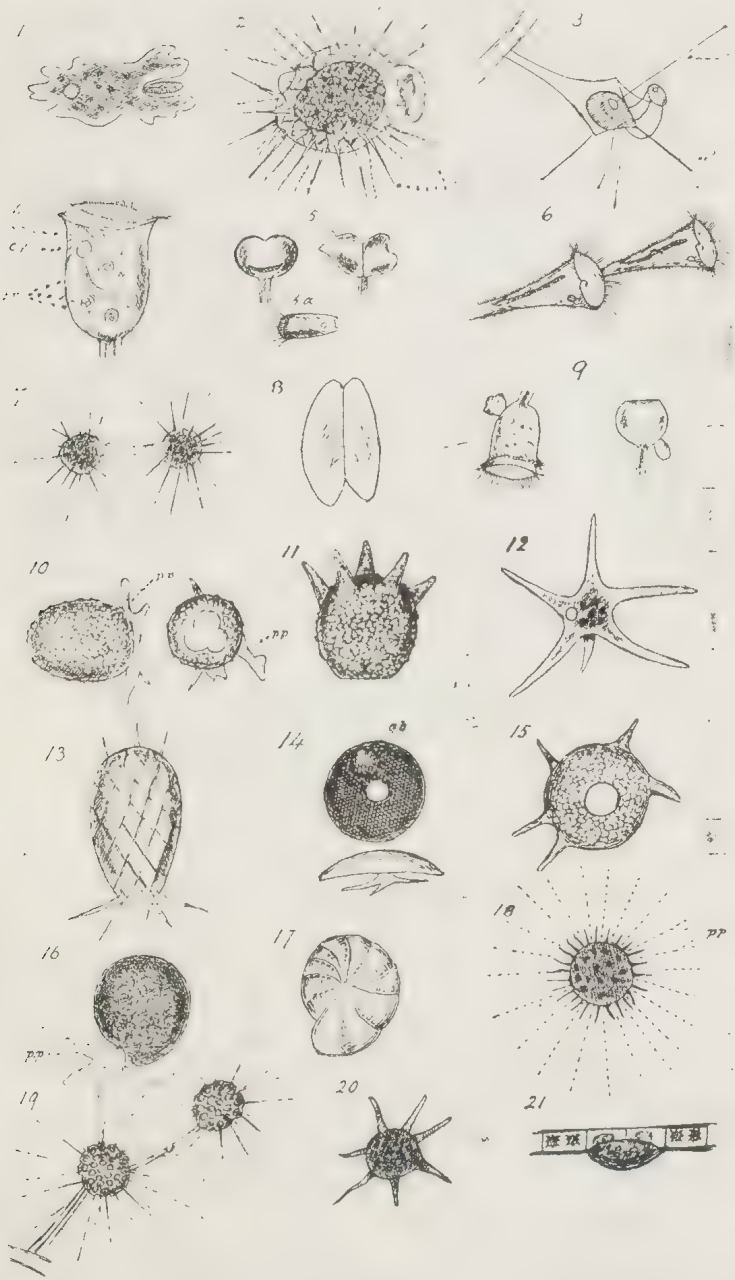
A most interesting subdivision of the sub-class Actinopoda is the Heliozoa, or sun animals, so called from their resemblance to the conventional representation of the great luminary. This order is divided into four sub-orders, based upon the absence of or character of the enclosing envelope. Three of these sub-orders have been represented in our captures. The sub-order Aphrothoraca comprises those forms in which a hardened cortex is practically non-existent. Of those, one of the best known is *Actinosphærium eichornii*, Ehr. This is a comparatively large protozoon. It has some characteristics by which it can be easily identified; in the first place, the cytoplasm is extremely vacuolar, bearing some resemblance to a sphere of tiny soap-bubbles. Another peculiarity is the very large number of nuclei present; as many as 300 have been found in an old specimen. Extending outward from the surface

of the body are numerous ray-like pseudopodia which are stiffened by "axial rods," but which are not by any means made rigid thereby, as is evidenced by the way in which they capture and ingest food, as referred to earlier.

Actinophrys sol, Ehr., has some resemblance to Actinosphærium, but is considerably smaller. Actinophrys has not the *extremely* vacuolar character of the other, neither is it multinucleate, and an extremely large contractile vesicle generally develops, bulging out the cortex in a marked manner before bursting.

Of the second sub-order of Heliozoa, Chlamydophora, it has not been our good fortune to find a representative. The third sub-order, Chalarothoraca, comprises forms which possess an investment of scales placed tangentially, and also silicious spines or spicules extending radially from the whole surface. Of this group we have taken two or three species of the genus Acanthocystis, Carter. Between the spines on the surface long granular pseudopodia are extended, which resemble strings of beads. In many cases a symbiotic green organism is found in numbers within the cytoplasm. These green bodies are not an integral part of the animal. Their presence furnishes an example of symbiosis, or the living together of two organisms for mutual benefit, which is not an uncommon occurrence amongst Protozoa. The green granules are chlorophyll contained within numerous plants known as Zoochlorellæ. The plants, when not living symbiotically, are flagellate organisms, *Chlorella vulgaris*, allied to Protococcus. On obtaining entrance into an animal they lose their flagella and live within the host on the best of terms. The mutual benefit is of this nature: during the processes of metabolism in the cell that is, the breaking down and building up of the cell substance through its activities carbon dioxide is produced: this suits the requirements of the plant inhabitants excellently. By the aid of their chlorophyll they break up the CO_2, absorb the carbon, thus setting free the oxygen to be used in the oxygenation of animal cell. How these plants escape digestion is an interesting question.

The fourth subdivision, Desmothoraca, furnishes the very beautiful form *Clathrulina elegans*, Cienk. This animal secretes a spherical, chitinous test, perforated by numerous holes, which give it a decidedly lattice-like appearance. The test is attached to some medium of support by a lengthy peduncle. Long pseudopodia are extended through the holes in the test. On dividing the young animals frequently attach themselves to the test of the parent, thus forming colonies. Very fine examples of this Protozoan may be had in our Botanic Garden lake.



cv Contractile vacuole; *fv* Food vacuole; *ph* Pharynx; *pp* Pseudopodia; *gb* Gas bubble.

Protozoa, with the exception of figures 3, 4, 5, 6, 8, 9, illustrating the Class Sarcodina. Much enlarged.

A form the position of which as regards its classification is somewhat doubtful is *Vampyrella laterita*, Leidy. It may be classed either with the Rhizopoda or Heliozoa, to both of which it bears a resemblance when assuming different forms. It received the name *V. spirogyra*, as it was erroneously supposed to live on the alga Spirogyra. I have, however, seen the animal feeding on Zygnema, another filamentous alga. When not feeding it is somewhat star-shaped in form. On coming into contact with a food plant of the sort mentioned it settles down upon it a shapeless mass, and after a time succeeds in penetrating the cell wall and devours the cell contents.

EXPLANATION OF PLATE.

	Approximate size of animal.
1.—Amœba about to ingest a diatom ..	—
2.—*Actinosphærium eichornii* ingesting a rotifer	dia., 80 to 300 μ.
3.—Acineta, sp., sucking out contents of an infusorian	
4.—Formation of food vacuoles in Vorticella	
5.—Longitudinal fission in Vorticella; 5*a*, separated zooid	—
6.—Transverse fission in Stentor	
7.—Fission in *Actinophrys sol*	50 μ. (body part).
8.—Conjugation in *Paramœcium aurelia*—isogamy	
9.—Conjugation in Vorticella—anisogamy ..	
10.—*Difflugia lobostoma*	100 μ. length
11.—*D. corona*	180 μ. length
12.—*Dactylosphærium* (*Amœba*) *radiosum* ..	30 μ. (body only)
13.—Euglypha, sp.	
14.—*Arcella discoides*, with contained gas bubble	150 μ.
15.—*Centropyxis aculeata*	125 μ.
16.—*Lesquereusia spiralis*	100 μ.
17.—Test of *Polystomella crispa*	
18.—*Acanthocystis erinaceus*	16 μ.
19.—*Clathrulina elegans*	80 μ.
20.—*Vampyrella laterita*, Heliozoan form, not feeding	40 μ.
21.—Same, feeding	

NOTE.—The measurements, which are given in micro-millimetres, may be altered to approximate fractions of an inch if desired by using the number of micra as the numerator of a fraction with 25 000 as denominator.

ON A THALASSOID ELEMENT IN THE AUSTRALIAN MOLLUSCAN FAUNA.

By CHARLES HEDLEY, Australian Museum, Sydney.
(Communicated by CHAS. OKE.)

(*Read before the Field Naturalists' Club of Victoria, 14th May, 1923.*)

IN certain inland waters of other continents occur animals of marine affinities which are quite distinct from the ordinary fluviatile types. Such have been carefully examined in the African Lake Tanganyika, where zoologists were astonished at the appearance of jelly-fish, prawns, crabs, and of odd shells of a marine pattern.* For this assemblage, Bourguignat, an early worker in this field, proposed † the useful term "thalassoid," approved by Von Martens and E. A. Smith.‡

No one, so far as I know, has yet noticed the existence in Australia of a thalassoid fauna. With the hope that other naturalists will develop further this interesting subject, I now announce the molluscan genus *Coxiella* to be a true thalassoid.

Coxiella is a genus of operculate gasteropods, confined to Australia and Tasmania: related to a marine genus, *Truncatella*, for which, indeed, it was at first mistaken, but differing from that by a concentric operculum; it dwells in saline pools, which are sometimes salter than the sea; has its focus of distribution in Western Australia, whence the genus migrated east through South Australia and Victoria to Tasmania, and is probably of a high antiquity. Future research may perhaps distinguish physiological features to correspond with the unusual environment.

The story of the discovery of the first *Coxiella* has been missed both by local writers and by conchologists abroad. It is as follows: During his exploration of Australia Felix, Sir Thomas Mitchell reached a saline lake, which he named Mitre Lake, under Mount Arapiles, more than a hundred miles distant from the sea, and near the present western boundary of Victoria. Here Mitchell observed that, in association with the maritime herb, Salicornia, "Along the water's edge a very minute shell had been thrown up in considerable quantities by the waves." This shell from Mitre Lake was referred to James De Carle Sowerby, who named it *Truncatella filosa*. Sowerby left unfulfilled a promise to publish a fuller account of the new species in a scientific serial, but four years afterwards he gave a good figure of it under the changed name of *Truncatella striata*.

Mitchell's account of the disposition of the species was con-

* Moore, *Nature*, July, 1897, pp. 198–200.
† Bull. Soc. Malac., France, iii., 1886, p. 143.
‡ Proc. Zool. Soc., 1906, i., p. 181.

firmed by Dr. J. E. Taylor ("Our Island Continent," 1886, p. 162), who, describing the source of some of Smith's co-types of *Coxiella confusa*, wrote: "Along the banks" [of the brackish Lake Corangamite] "are layers of small shells, which the wind heaps and piles up in singular-looking drift lines."

The present writer also once saw this *Coxiella* as a pure formation of millions of shells packed in wind-rows on the beach of the bitter waters of the crater-lake Bullen-Merri, near Camperdown, Victoria.

Under the erroneous generic and specific names of "*Blanfordia striatula*," Angas recorded *C. filosa* from the neighbourhood of Adelaide and from Tasmania. Afterwards it was thus figured and described by Cox from South Australia, Victoria, and Tasmania. Then Johnston proposed the name of *Potamiopsis badgerensis* for a fossil form of *C. filosa* from the islands of Bass Strait. When E. A. Smith learned that Cox had exchanged identities of an eastern and a western species, and thus misused Menke's name, he unfortunately overlooked those names supplied by Sowerby and Johnston, and proceeded to substitute the singularly appropriate specific "*confusa*" for *striatula*, Cox, not Menke.

Pfeiffer was once (1857) inclined to unite Sowerby's *striata* to Menke's *striatula*, but the figures of Küster and of Reeve show how distinct they are. *C. striatula* increases more rapidly in breadth, and is imperforate; besides, if Smith were correct in uniting *Blanfordia pyrrhostoma*, Cox, to *Truncatella striatula*, Menke, the western form attains a much larger size—namely, a length of 18 mm. and a breadth of 7 mm. in six remaining whorls.

Because the literature relating to this eastern *Coxiella* is scattered, and unknown to modern writers, the following index of it is now presented:—

1838. —*Truncatella filosa*, J. De C. Sowerby, in Mitchell, "Three Expeditions," &c., ii., p. 190.
1842. —*Truncatella striata*, J. De C. Sowerby, in Reeve, Conch. Syst., ii., p. 94, pl. 182, fig. 4.
1845.—*Truncatella striata*, Catlow and Reeve, "Conchologists' Nomenclator," p. 169.
1846.—*Truncatella striata*, Pfeiffer, Zeitsch. f. Malak., iii., p. 190.
1855.—*Truncatella striata*, Küster, Conch. Cab., Bd. i., abth. 23, p. 16.
1856.—*Truncatella striata*, H. and A. Adams, Genera Recent Moll., ii., p. 311.
1857.—*Truncatella striata*, Pfeiffer, Brit. Mus. Cat. Auriculidæ, p. 143.

1858.—*Truncatella striata*, Pfeiffer, Mon. Pneum. Viv., ii., p. 9.
1864.—*Blanfordia striatula*, Angas, Proc. Zool. Soc., 1863, p. 523.
1864.—*Blanfordia striatula*, Cox, Cat. Austr. Land Shells, p. 40.
1868.—*Blanfordia striatula*, Cox, Monogr. Austr. Land Shells, p. 95, pl. 15, fig. 13, *a*, *b*, *c*.
1876.—*Pomiatopsis striatula*, Ten.-Woods, Proc. Roy. Soc. Tasm., 1875, p. 78.
1879.—*Pomatiopsis badgerensis*, Johnston, Proc. Roy. Soc. Tasm., 1878, p. 26.
1888.—*Pomatiopsis badgerensis*, Johnston, Geol. Tasm., pp. 322, 329, 330.
1893.—*Pomatiopsis striatula*, Adcock, Hand-list Aquatic Moll., S.A., p. 7.
1894.—*Blandfordia striatula*, Tate, Trans. Roy. Soc. S.A., xviii., p. 196.
1894.—*Coxiella striatula* (in part), Smith, Proc. Malac. Soc., i., p. 98.
1896.—*Pomatiopsis striatula*, Mulder, *Geelong Naturalist*, v., part 4, p. 8.
1898.—*Coxiella confusa*, Smith, Proc. Malac. Soc., iii., p. 76.
1900.—*Pomiatopsis striatula*, Lodder, Proc. Roy. Soc. Tasm., 1899, p. 138.
1901.—*Coxiella confusa*, Tate and May, Proc. Linn. Soc. N.S.W., xxvi., pp. 390, 449.
1904.—*Coxiella badgerensis*, Hedley, Proc. Linn. Soc. N.S.W., xxix., p. 183.
1905.—*Coxiella confusa*, Gatliff, *Victorian Naturalist*, xxii., p. 14.
1919.—*Coxiella striatula* (in part), Chapman, Proc. Roy. Soc. Vict., xxxii., p. 25, pl. iii., fig. 3.
1921.—*Coxiella badgerensis*, May, Check-list Moll. Tasmania, p. 57.

A GIPPSLAND BEAUTY SPOT.

CAN IT BE RESERVED AS A "NATURAL SANCTUARY"?

DEAD-COCK Creek has recently come into notice owing to the suggestion that it should be permanently reserved as a beauty spot. It is a western tributary of the Mitchell River, the junction being a few miles from Lindenow and some twenty-five miles above Bairnsdale. Nearly fifty years ago the late Mr. A. W. Howitt, F.G.S., made a canoe trip down the Mitchell River in order to carry out some geological investigations among the Iguana Creek beds along its course.

It was a hot summer day, with terrific bush-fires raging among the mountains far and near: the country was shrouded in a cloud of smoke, particles of charred leaves floated

about, and the heat was stifling when Howitt, with his two aboriginal companions, had paddled and scrambled down the river to where the ravines of Bull Creek and Dead-Cock Creek join the deep valley of the Mitchell, only a few chains apart.

We are not at the moment concerned with his conclusions as to the Iguana Creek beds, but his account of Dead-Cock Creek and his sketch of the "Ngrung a narguna," as they were printed in Report No. III. (1876) of the Geological Survey of Victoria, deserve to be republished for the present generation:—

"This was Dead-Cock Creek, and I determined, as we had only one canoe, to here leave the river and make to where the track crossed coming down from Tabberabbera. Here I waited for an hour, bathed in the delightfully soft, refreshing water, and had a second breakfast in the shady, rock-bound mouth of the creek, which was now dry, excepting some pools in the rocky floor. Then, being refreshed, we rolled up our things, left the canoe for the 'mrarts' (ghosts), as 'Bungil Bottle' expressed it, and marched up the bed of Dead-Cock Creek.

"It was now past noon, and in the deep river valley, among the rocks and boulders, the heat had been intolerable, for, to improve matters, we had now got down among the fires, which we could hear roaring high up above us on the summit of the cliffs. Volumes of smoke eddied across the valley, and the constantly-recurring crash of falling trees told us what was going on far up above the deep chasm of Dead-Cock Creek.

"What a contrast! We were walking along the almost horizontal surface of the Iguana Creek beds, swept clean by the spring floods. The chasm was not more than forty feet in width, and was completely shaded by huge Acmenias (Eugenias), Pittosporums, and Lightwoods, with a few giant gum-trees. Their massive boles and mouldering logs were covered by Polypodia and other small ferns, and on either side rose the steep hillsides, clothed with tall grass and shaded by large Stringybark and other gum-trees or else sheer precipices of rock. All the birds of the country appeared to have taken refuge in these cool recesses from the fiery furnace of the outside world.

"After slowly picking my way along the rocky floor of the creek for perhaps a mile, admiring the beauty of the scene, and occasionally drinking from the rock-pools of 'nice cool la-en yarn' (water), as 'Turnmile' phrased it, we came to a picturesque cavern formed by the wearing away of the soft beds from underneath a hard course of grit. It extended in a semicircular form across the creek, the roof of the cave being the ledge over which the water falls during rainy times. The blackfellows were delighted with this 'house,' and planned to themselves how they could come and camp here and collect

the tails of the 'Woorayl' (Lyre-bird) among the scrubs of the river and feast on the native bears and wallabies, poor unsuspecting creatures of the neighbourhood. Here we had to climb up the cliffs at the side by a wallaby track to get out, but, being once again in the creek-bed, there were the same pleasant shades as before. A little further on we came to a second cave, a wonderfully picturesque and beautiful spot.

"As before, a soft bed of reddish shale has been worn away by the backwash of waters falling over a hard ledge, but here the cave was higher and deeper. In front was a pool of water looking black and smooth as glass under the shade of the 'Lilly-pillies' (Eugenia). Stalactites fringed the rim of the cavern and hung in pendent rows from its roof. A huge stalactitic mass at one side joined the roof to the floor so as to screen the cavern partly, and on either hand the rocks rose up almost perpendicularly for, I think, not less than 400 or 500 feet. Two Lyre-birds which were disporting themselves in the cavern almost delayed their departure too long. 'Bungil Bottle' narrowly missed one with a lump of wood, which he threw as quick as lightning, and Master Turnmile, being very excited, was in the act of throwing my new tomahawk at the other among the rocks when I stopped him. I preferred my new tomahawk to a dead Lyre-bird, but my aboriginal seemed not to see it in the same light.

"While I made a light sketch (No. 21, reproduced above) and examined the rocks, the two blackfellows looked round the cave with many wondering exclamations of 'Ko-ki' at the stalactites, two of which they carried off as wonderful objects to show their friends. I was amused listening to them conversing in the mouth of the cavern. Master Turnmile, 'the dandy,' thought it would be a splendid place to run off to with

one of the aboriginal young damsels—a house ready provided, plenty of wallabies and native bears, and a country unknown to the other blackfellows. 'Bungil Bottle,' on his part, was impressed vividly by the belief that this was indeed the haunt of the mysterious creature the 'nargun'—the 'ngrung a narguna' (den of the nargun).

"The nargun, according to their belief, is a mysterious creature, a cave-dweller, which haunts various places of the bush. So far as I could learn, the blacks believe the nargun haunts especially the Mitchell valley, which we had just followed from Tabberaberra. What is the appearance of a nargun they cannot describe, excepting that it is like a rock ('wallung'), and is said to be all stone except the breast and the arms and the hands. They say it inhabits caverns, into which it drags unwary passers-by. If you throw a spear or fire at it with a bullet, they say the spear or bullet will turn back on you and wound you. There is a cave in the Miocene limestones of Lake Tyers which is said to be inhabited by a nargun, with which one of the natives, 'Dan's mother,' according to report, had a fight. This is all I could learn.

"The rocks at the 'nargun's cave' I found to be the usual alternations of sandstones and grits with pebble conglomerates, and here, as in the typical locality near Iguana Creek, were thick beds of soft reddish rock, apparently devoid of stratification and evidently calcareous, judging from the stalactites which depended from the roofs and sides. From the 'ngrung a narguna' we found it no easy matter to escape. The ledge which formed the roof was some 30 feet above where we stood, and overhung the deep pool, except in one corner, at which a narrow ledge gave entrance to the cavern. The rocks on either hand rose up almost perpendicularly, far up above the tops of the trees in jutting sandstone ledges. The only plan seemed to be to go back down the creek and climb up the mountain-sides.

"At last I got the two blackfellows to fall a tall, straight, young tree, and after much struggling we got it reared up at the corner of the roof. 'Bungil Bottle' cut foot notches with his tomahawk, and ascended as easily as going up stairs. I followed without my boots, and, long before I had walked up the notches of these 30 feet of height, heartily wished, for once, that my feet had been as hard and horny in the soles as those of my black attendants. The roof of the cavern was another succession of sandstone beds, nearly horizontal, and forming, as it were, broad steps up the creek. But the trees were now not so high, and the sides of the glen widened out into a gully.

"The heat and smoke were excessive after coming from among the cool shades below. A mile or two more and we were in the

forest country. The fires were raging furiously, in some cases having only just passed; and where we struck the Tabberabbera track the conflagration was roaring up the opposite hillsides in dense volumes of fire and smoke. The scrubs were cracking and detonating like a fusillade. In a little green oasis which had escaped the flame we rested, and the blackfellows talked to each other of the sight they had seen, and then counted the number of native bears ('goola') which had taken refuge in the trees about and piteously looked round on the fiery desolation. Seven miles' tramp through the smouldering forests, and a ride of twenty, took me back to Bairnsdale that night."

On two occasions I have had the opportunity of camping in the cave so much admired by "Turnnile," and would like to briefly supplement Howitt's interesting description. The two creeks, in their deep, shut-in gorges, possess, in many respects, a unique flora, but reminiscent in part of distant Croajingolong, and their environment is very unlike anything in Victoria that I have seen. Even the so-called 'Gippsland crocodile,' the water-lizard, *Physignathus lesueurii*, Gray, var. *Howittii*, M'Coy, frequents its pools and the near-by river.

There are three big trees growing along the beds of these creeks *Eugenia Smithii* (Lilly-pilly), *Pittosporum undulatum*, and, commonest of all, though not mentioned by Howitt, *Tristania laurina* (Kanooka). To say that they thrive in these sheltered, shady ravines is to understate the truth, for, while elsewhere I have rarely seen them more than a foot in diameter, here specimens of all three were found twelve to fifteen feet in girth and fifty to a hundred feet in height. No eucalypts grow at the bottom of the gorges, but, perched part way up, and often overhanging the edges of the cliff-like walls, we found many fine specimens of *Sterculia diversifolia* (Currajong). One of these was a giant, and measured over fifteen feet in girth. An occasional Currajong was mixed with the Messmates and Stringybarks of the table-land above, the only part of Victoria (except in the far north, near the Murray River) in which I have seen it in its native state.

The eucalypts of the district are rapidly disappearing as the result of periodical bush-fires, but in the sheltered ravines no fire has apparently penetrated since Howitt was there a half-century ago, and the luxuriant vegetation which so delighted him still remains as a legacy to Victoria.

We saw no sassafras or beech, but ferns, musk, and similar gully shrubs are abundant, and some half-dozen creepers and vines, such as Tecoma, Clematis, and Smilax, have festooned their rope-like stems from the trees overhanging the creek.

On a four-day visit recently we heard or saw over thirty varieties of birds, including the Lyre-bird, the Wonga Pigeon,

the Bower-bird, and, of course, the Bell-birds, which kept up a tinkling orchestra at the pool in front of our cave.

Scarce a quarter-mile away, the Bull Creek ravine is very similar, with even more luxuriant growth, but with not quite such precipitous walls as Dead-Cock Creek. How these creeks got these names I do not know, but they certainly deserve more pleasing titles. It would be a pity if advancing civilization (!) were to be allowed to destroy this unique and natural sanctuary for the native flora and fauna that has for so long survived in the ravines of these two creeks.—HEBER GREEN.

[In a paper entitled "Bird-life on the Upper Mitchell," by Mr. F. J. Thomas, read before the Field Naturalists' Club on 15th January, 1912 (vol. xxviii., p. 199), the author gave some account of a visit to the Dead-Cock and Bull Creek gorges. He paid special attention to the birds of the locality, and gives a list of forty-seven birds as having been observed by him. He regarded the Sanguineous Honey-eater, Bell Miner, Rufous Fantail, and Wonga Pigeon as the most noteworthy seen.—ED. *Vict. Nat.*]

BOOK NOTICE.

AN ELEMENTARY TEXT-BOOK OF AUSTRALIAN FOREST BOTANY. By C. T. White, F.L.S., Government Botanist of Queensland. Published under the direction of the Forestry Commissioners of New South Wales. Sydney: J. Spence, Acting Government Printer. 1922. 223 pp., 8 x 4½ in.

This is the first volume of a work which has been designed for the use of forest officers and students of forestry. It is divided into three sections — morphology, anatomy, and physiology—occupying sixteen chapters. Each chapter is very complete, all technical terms used are fully explained, and in most cases accompanied by illustrations taken from Australian plants or trees. Particular attention has been paid to the derivations of words used, so that it becomes almost a botanical dictionary. The illustrations, mostly included in the text, are particularly clear, and should be easily understood. An excellent index, occupying fifteen pages, is an outstanding feature of the work. A second volume is promised, which is to be largely devoted to systematic botany and Australian plant associations, more particularly the various forest types and their characteristics, such as the structure of timbers and their identification. As a foundation for gaining a knowledge of botany the volume under notice seems admirably planned. We congratulate Mr. White on his production, and look forward with great interest to the appearance of the second volume. The work is obtainable through the booksellers at eight shillings and sixpence.

VICTORIAN EUCALYPTS. — In Part LIX. of "A Critical Revision of the Genus Eucalyptus," issued last month, Mr. Maiden continues to deal with the inflorescence of the genus, and submits "an improved tentative classification" (anthereal). According to this the Victorian species would be ranged somewhat as follows:—

(*A*) Renantheræ.—Anthers kidney-shaped, the lobes eventually becoming "confluent" (to use Bentham's term). The gland medium-sized, and visible from the front. All eastern and Tasmanian.

amygdalina.	obliqua.	Muelleriana.
*australiana.	gigantea.	piperita.
dives.	*fastigata.	pilularis.
radiata.	capitellata.	Sieberiana.
numerosa.	Blaxlandii.	stricta.
regnans.	macrorrhyncha.	hæmastoma.
vitrea.	Consideniana.	Smithii.
coriacea.	eugenioides.	Mitchelliana.
stellulata.	ligustrina.	diversifolia.

(*a*) Sub-section Alpinæ.—Anthers very large, lobes longer, opening more widely.

alpina.

(*B*) Renantheroideæ. — Anther lobes divergent or sometimes nearly parallel.

diversifolia.

(*C*) Porantheroideæ.—Anthers small, globular, glands at top, filaments inserted at the base or nearly. Eastern.

hemiphloia.	odorata.
microcarpa.	Bosistoana.
*Woollsiana.	Behriana.
albens.	polybractea (fruticetorum).
bicolor.	acacioides (viridis).

(*D*) Terminales.—Anthers with terminal pores, erect or oblique on filament.

Baueriana.	leucoxylon.	Blackburniana.
melliodora.	sideroxylon.	uncinata.
polyanthemos.	paniculata.	leptophylla.

(*E*) Platyantheræ.—Anthers broad, thick, white; lobes parallel, or nearly; gland on top or top of gland visible from the front; filament at base.

oleosa.	transcontinentalis.	Flocktoniæ.

(*a*) Sub-section Graciles. — "Very large white anthers, opening obliquely, filament at base, gland small or absent, cells widely opened, with parallel slits."

gracilis.	calycogona.

* Not admitted by Mr. Maiden.

(*F*) Macrantheræ.—Anther lobes opening in parallel slits, top of gland sometimes showing from the front. Filament inserted at base of gland.

(*a*) Tereticornes.

tereticornis.	Perriniana.	botryoides.
rostrata.	Kitsoniana.	clæophora.
viminalis.	cladocalyx.	longifolia.
rubida.	globulus.	Stuartiana.
maculosa.	Maideni.	*Bridgesiana.
ovata.	goniocalyx.	Studleyensis.
*camphora.	nitens.	inerassata.
Yarraensis.	cinerea.	dumosa.
Gunnii.	neglecta.	angulosa.

(*b*) Longiores.—Anthers long and narrow.

corymbosa. maculata.

Part LX. of the "Critical Revision," which closely followed the preceding number, deals with the fruits—their size and shape, the capsule in its relation to the calyx tube, its valves, and the rim.—C. S. Sutton.

For several weeks the Tasmanian Crimson Berry has been retailed in large quantities by the flower-sellers of Melbourne. This is a shrubby Epacrid, *Cyathodes acerosa*, R. Br. (*Styphelia oxycedrus*, F. v. M.), which grows in considerable quantities in the hilly portions of Tasmania. It is to be hoped that the fact of its having attracted public favour will not lead to its extermination. It is also a native of Victoria, having been recorded from Mt. Hunter, in the National Park, Wilson's Promontory, and is recorded from New Zealand.

ADDITIONS AND CORRECTIONS TO LIST OF MEMBERS IN JULY *NATURALIST*.

May 1911 Firth, J., Box 79, Mildura ... ... Forestry

May 1919 ♪ Goudie, J. C., Boundary-road, Maldon ... Ent. (Col.)

Mar. 1923 Latham, A. T., 26 Scott-street, St. Kilda

Mar. 1923 Lewis, A. N., "Wallington," Hotham-street, East Melbourne ... ... Geology

Mar. 1923 Miller, V., 10 Lambeth-place, St. Kilda

May 1923 Parr, Walter J., 18 Bokhara-road, Caulfield ... Palæontology

July 1922 Williamson, A. J., Bank of Victoria, Dunolly

* Not admitted by Mr. Maiden.

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The Victorian Naturalist:

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— OF —

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Hon. Editor: F. G. A. BARNARD, Esq.

The Author of each article is responsible for the facts and opinions recorded.

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1923.

Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 10th SEPTEMBER, 1923.

1. Correspondence and Reports.

2. Election of Members.

As Ordinary Member—	Proposer.	Seconder.
Miss Hilda Gabriel, Walmer-street, Kew.	Mr. F. Chapman, A.L.S.	Mr. F. G. A. Barnard.
Mr. A. C. Collins, 380 Flinders-lane, Melbourne.	Mr. F. Chapman, A.L.S.	Mr. J. A. Kershaw, F.E.S.

3. Nominations for Membership.

4. General Business.

5. Remarks by Exhibitors relative to their Specimens.

   Ten minutes' adjournment for discussion of Exhibits.

6. Reading of Papers and Discussion thereon.

   1. By Mr. F. Chapman, A.L.S.—"The Fossiliferous Beds of Violet Creek, near Hamilton."

   2. By Mr. S. Butler (communicated by Mr. J. Searle)—"Notes on Spiders." (Illustrated by lantern views.)

7. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

   Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and *Naturalist*. Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Club year ended on 30th April last. Any subscriptions overdue should be forwarded to the Hon. Treasurer *at once*.

Subscriptions for 1923–4 are now due, and should be paid to the Hon. Treasurer as early as possible.

The Victorian Naturalist.

Vol. XL.—No. 5. SEPTEMBER 6, 1923. No. 477.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 13th August, 1923. The president, Mr. C. Daley, B.A., F.L.S., occupied the chair, and about sixty members and visitors were present.

CORRESPONDENCE.

From Assoc.-Prof. A. C. Rivett, M.A., D.Sc., hon. sec. Australian National Research Council, calling attention to a public meeting in connection with the Pan-Pacific Science Congress to be held in the Assembly Hall, Collins-street, on Thursday evening, 16th August, during which it was proposed to hold a discussion on the preservation of the Australian fauna, and inviting members of the Club to be present.

From Mr. H. A. Howard, hon. sec. Canterbury Horticultural Society, inviting members of the Club to be present at the planting of trees in Beckett Park, Balwyn, by Their Excellencies Lord and Lady Forster on Saturday afternoon, 20th October.

ELECTION OF MEMBER.

On a ballot being taken, Miss F. Jude, 13 Dickens-street, St. Kilda, was duly elected an ordinary member of the Club.

REPORT.

A report of the visit to the National Museum on Saturday, 21st July, was, in the absence of the leader, Mr. J. A. Kershaw, F.E.S., given by Mr. F. Pitcher, who said that a large party of members had attended. Some time was spent in the several halls of the Museum, where recent additions, &c., were pointed out; then the "H. L. White Collection" of bird-skins and the entomological collections were inspected and explained.

GENERAL BUSINESS.

Mr. F. G. A. Barnard stated that a deputation of persons interested in the preservation of the vegetation in the higher altitudes of the State would wait upon the Minister of Forests on Wednesday, 15th inst., and asked any members interested to try and be present at the interview.

The hon. sec., Mr. C. Oke, reported that he had interviewed Mr. F. Lewis, Chief Inspector of the Fisheries and Game Department, with regard to the appointment of a fish culturalist, and moved "That in the opinion of this Club it is desirable that the State Government should appoint a fish culturalist to conduct experiments in breeding certain of the indigenous fishes with the view of stocking some of the depleted streams of the State, and that letters to that effect be forwarded to the

Chief Secretary and the Treasurer." This was seconded by Mr. E. Cox, and carried unanimously.

The chairman called attention to the date fixed for the annual exhibition of wild-flowers — viz., Wednesday, 3rd October, and urged members to use every effort to make the exhibition a success. It would be held in the Melbourne Town Hall, and offers of assistance on the day by both ladies and gentlemen would be welcomed by the committee.

Mr. F. Pitcher asked if any decision had been come to regarding the disposal of the profits of the exhibition, and, on being informed that the matter had not yet been considered, moved that half the net proceeds be handed over to the Victorian Bush Nursing Association. He said that, as the Club depended so much on country people for the success of its wild-flower exhibitions, he thought it would be a nice spirit to help them in return. The resolution was seconded by Mr. H. B. Williamson, F.L.S., and supported by Miss Rose Currie.

On being put to the meeting the motion was carried unanimously.

The chairman said that Mr. V. Miller had placed a number of collecting tubes at the disposal of members, which could be obtained at the close of the meeting.

PAPER READ.

By Dr. C. S. Sutton, B.S., entitled "The Vegetation of Cradle Mountain, Tasmania."

The author, by means of an excellent series of lantern slides of the district, and of individual trees and plants, gave an interesting account of the plant life of the district, which is the most elevated portion of Tasmania, ranging up to slightly over 5,000 feet above sea-level. The scenery of the district is very striking, being of volcanic character, with numerous almost inaccessible hillsides, and the vegetation contains many species of more than passing interest. [One of the Proteaceæ met with, *Bellendena montana*, R. Br., is illustrated in this issue.—Ed. *Vict. Nat.*]

An interesting discussion followed, in which Messrs. G. Coghill, A. N. Lewis, P. R. H. St. John, E. E. Pescott, F. G. A. Barnard, F. Pitcher, A. E. Keep, and the chairman took part. Mr. St. John said that the liliaceous plant *Blandfordia marginata*, Herb., "Christmas Bells," had been successfully grown at the Melbourne Botanic Gardens. Mr. Lewis said that in his garden at Hobart he had grown a number of the typical plants of the district, but, owing to the heavy rainfall to which they were accustomed in their native home, they required special attention as regards watering, not recovering from the slightest neglect in that respect.

In answer to questions, the author said that the pines

PLATE V.

MOUNTAIN ROCKET, *Bellendena montana*, R. Br.

Photo. C. S. SUTTON.

mentioned were indigenous to Tasmania. He had grown several plants from the district at his home in Carlton. Coal had been found near Barn Bluff, and the tracks generally were not difficult.

EXHIBITS.

By Mr. F. G. A. Barnard.—Flowering branhces of *Acacia elongata*, Long-podded Wattle, grown at Kew. Similar specimens were exhibited last month, showing the long flowering period of this species.

By Mr. A. E. Rodda, on behalf of Geological Survey of Victoria.—Phosphate rocks from Mansfield (Victoria), Algeria, Curaçoa, and Aruba Island, South America.

By Dr. C. S. Sutton.—Herbarium specimens and photographs in illustration of paper.

After the usual conversazione the meeting terminated.

TASMANIAN PROTEACEÆ.—The Proteaceæ are one of the most ancient and most natural groups of plants. Generally speaking, it is characterized by the stability of its members, few of them showing much variation; yet the not very distant and comparatively recent isolation of Tasmania from the mainland has resulted in the development there of some very interesting forms. As compared with Victoria, which has 10 genera and 54 species, only 5 of which are endemic, the island possesses 11 genera (3 endemic) and 22 species, half of which are peculiar to it. Only *Persoonia juniperina*, *Grevillea australis*, *Banksia marginata*, *B. serrata*, and six Hakeas are common to both, and all of these are mainly confined to the lowlands. *Isopogon ceratophyllus* and *Hakea ulicina* do not extend beyond the islands of the Strait, and *Conospermum taxifolium* has skipped these and ranges from the east coast of New South Wales down to the same side of Tasmania. Of the endemic species, all except *Lomatia tinctoria*, a handsome shrub of three to five feet, with long, spreading racemes of creamy-white flowers, are montane, and more or less confined to the southern and western parts. Agastachys, Cenarrhenes, Telopea, *Persoonia Gunnii*, and *Lomatia polymorpha* are sylvan, and grow to tall shrubs or small trees. The four Orites, common on most mountains between 3,000 and 4,000 feet, where, like our own single species, *O. lancifolia*, they seem altogether out of place, are extremely sclerophyllous, with thick, cylindrical or tightly revolute leaves and insignificant flowers. The most attractive species in the island—a picture of which is here given—is the Mountain Rocket, *Bellendena montana*, which shows its beautiful cone-shaped inflorescence of pink-tipped buds and creamy flowers from elevations of about 2,500 feet to the tops of the highest plateaux.

A TRIP TO THE BOGONG HIGH PLAINS.

By H. B. WILLIAMSON, F.L.S.

(*Read before the Field Naturalists' Club of Victoria, 12th Mar., 1923.*)

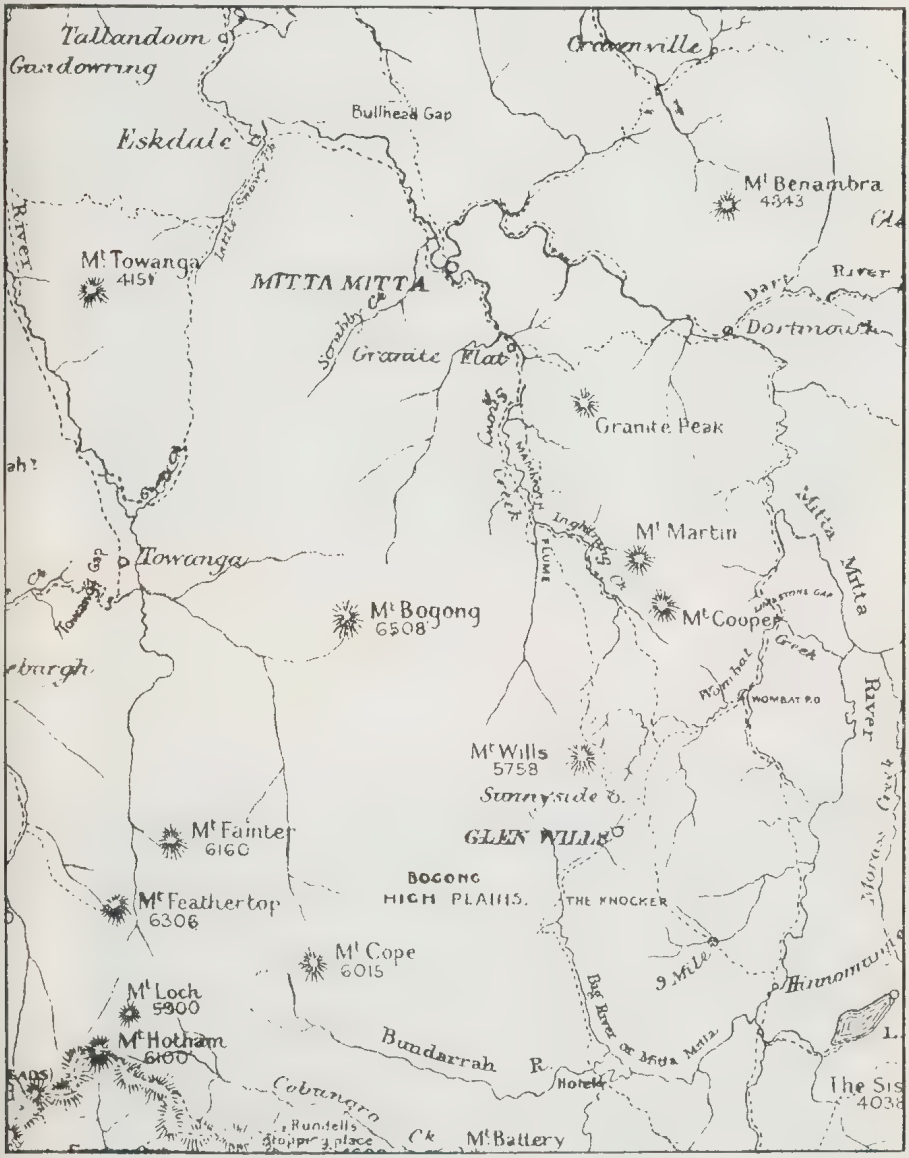
THIS interesting upland region, situated in the north-eastern portion of the State, is distant about 250 miles from Melbourne. It can be reached from Omeo *via* Bruthen, but the route from Mitta Mitta *via* Tallangatta was chosen by me owing to the presence at Mitta Mitta of Mr. S. F. Clinton, who had been in charge of the Mitta Mitta State school for some years, and who was spending his holidays there. Mr. Clinton is known throughout that district as an expert bushman, an enthusiastic mountain-climber, and a botanical collector.

Arriving at Mitta Mitta on 29th December last from Tallangatta, a 40-mile trip by car, I found my friend there. He had made arrangements with a guide, Mr. H. Downes, of Eskdale, to provide horses—one for the pack and one for myself—and, after being delayed a day by heavy rain, we rode on the 31st to Glen Wills, arriving there late in the evening. Our destination was a wayside homestead, where we were very hospitably entertained for the night. Mrs. Prendergast, our hostess, lives a mile or two on the Omeo side of Glen Wills, and she can provide very comfortable accommodation for a small party if notice is sent to her the day before.

Early on New Year's Day we set off for the heights, crossing the Big River (Mitta Mitta) at about a mile from the start. This stream was running strong, and, having a bed of boulders, it was not easy going for the horses. Mr. Clinton, who, by the way, had ridden his bicycle from Mitta Mitta, now travelled on foot, preferring that to taking turns with me in the saddle. The track is not well defined till near the top, where some work has been done in track-forming round the steep spurs. After about four hours' climbing we reached a patch of Snow Gums, *Eucalyptus coriacea*, in the shelter of which is a hut belonging to Mr. Kelly, who runs cattle on the High Plains. The horses were allowed freedom in a paddock round the hut, and, after partaking of lunch, we started off for Mount Nelson, two or three miles away. This was reached by easy travelling over undulating, open country, with scattered patches of Snow Gums, and covered with a carpet of "Snow Grass," chiefly *Poa cæspitosa*.

On the side of Mount Nelson we came across a patch of snow about fifty yards long, and below this, luxuriating near the ice-cold water, plants of the Silver Daisy, *Celmisia longifolia*, Snow Daisy, *Brachycome nivalis*, and White Purslane, *Claytonia australasica*—the last-named a cushiony mass of white flowers in wet depressions. The Silver Edelweiss, *Ewartia* (*Leontodon*

podium) *catipes*, formed a beautiful carpet here and there on the most exposed parts. The cattle soon gathered round us

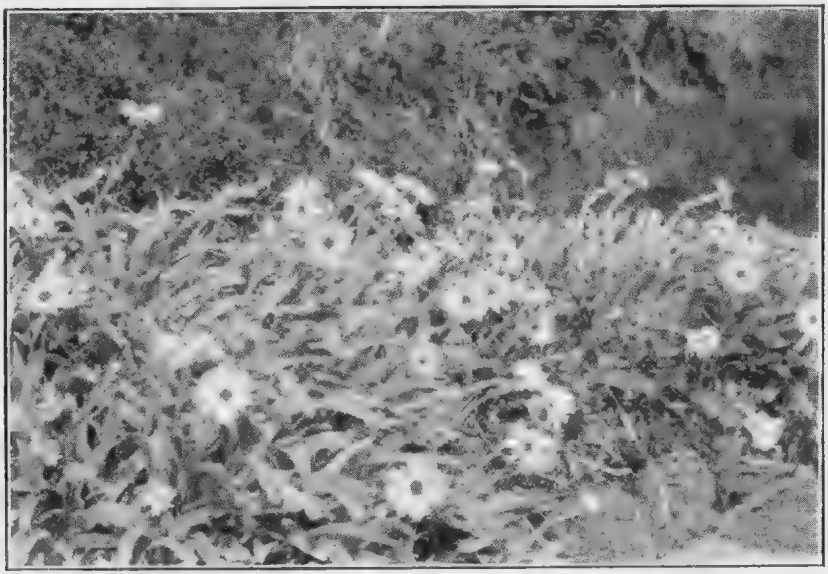


in curiosity and expectancy fine herds of Herefords that are fattened on the plains in summer and driven down in late autumn to the lowlands, many of them to travel further to

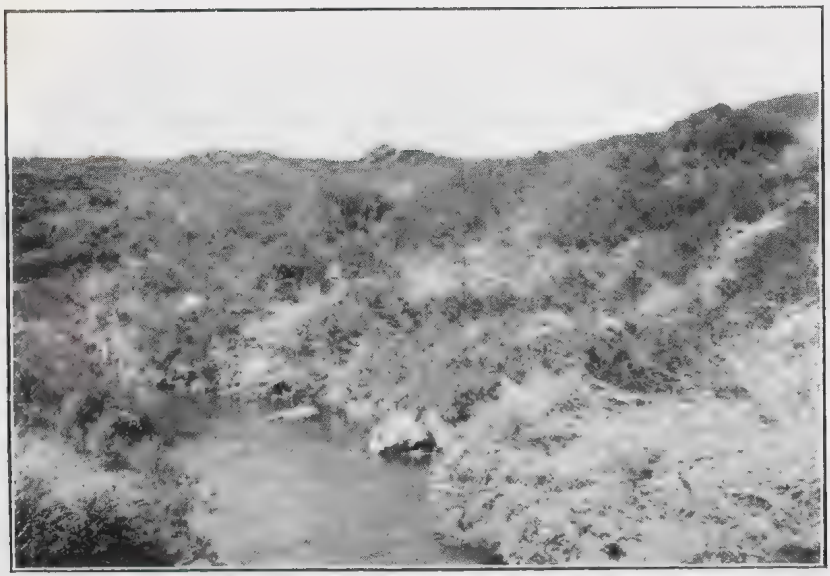
market. Their fondness for salt makes it easy to muster them, for they will come at the call of the stockmen, who regularly take salt out to them. The vegetation of these plains consists of a stunted growth of the shrubs Alpine Hovea, *Hovea longifolia*, Baw-Baw Heath, *Epacris Bawbawiensis*, Leathery Star-bush, *Pleurandropsis trymalioides*, Mountain Phebalium, *Phebalium podocarpoides*, and Mountain Beard-Heath, *Leucopogon Hookeri*. Hoary Sunray, *Helipterum incanum*, alpine form, and the Golden Everlasting, *Helichrysum lucidum*, were not yet blooming. They make a fine show later, which accounts for the warning given when starting up the hill—that we should not see many flowers.

Next morning early we set off across the plain, admiring the wonderful cloud effects, and reached what proved to be the most beautiful and interesting spot, the "Rocky Valley." The valley and the surrounding slopes were thickly strewed with granite boulders, and lovely clear streams fringed with alpine flowers flowed into it. The luxuriant form of *Celmisia longifolia*, var. *latifolia*, with large, daisy-like flowers and broad, silky-woolly leaves, was in itself a delight to the eye, while fine specimens of "Purple Eyebright," *Euphrasia collina* (pure white), interspersed with Baw-Baw Heath, *Epacris Bawbawiensis*, and Snow Aciphyll, *Aciphylla glacialis*, added to the splendour of the clear streams which ran in little cascades over the granite rocks. The growth of Yellow Kunzea, *K. Muelleri*, with light yellow flowers, often took the form of a closely-appressed mat, extending up the sides of the boulders. In sheltered places among rocks and Snow Gums the beautiful Alpine Mint-bush, *Prostanthera cuneata*, and Slaty Daisy Bush, *Olearia subrepanda*, were noted, the latter being photographed. Along the steep track on the scarp we were delighted with the show made by the Alpine Daisy Bush, *Olearia alpicola*, and Large-leaf Daisy Bush, *O. megalophylla*. Three small plants rarely gathered were got in exposed depressions—Alpine Stackhousia, *S. pulvinaris*, Mossy Knawel, *Scleranthus uniaroides*, and Snow Pennywort, *Diplaspis hydrocotylea*. The first-named formed bright green patches thickly studded with whitish, star-like flowers. A few blooms showed on the Leafy Bossea, *B. foliosa*, and the Pultenæas found flowering were Tufted Bush Pea, *P. fasciculata*, and Hard-head Bush Pea, *P. capitellata*. The latter has been gathered only once or twice before in Victoria. It was for long considered as a form of *P. stricta*, but in my Revision of the Genus I restored it to the specific rank which Sieber gave it, and from which it should never have been lowered. In morasses were found thick growths of Richea, *R. Gunnii*, and the Liliaceous plant *Astelia alpina*. Two plants I had not previously gathered grew in these places

PLATE VI.



CELMISIA LONGIFOLIA, Cass., var. LATIFOLIA.



ALPINE STREAM IN ROCKY VALLEY.

Photos. H. B. WILLIAMSON.

—Alpine Flower-rush, *Carpha alpina* (Cyperaceæ), and the beautiful Veined Sun-orchid, *Thelymitra venosa*, and the only other orchid seen, the Short-lip Leek-orchid, *Prasophyllum brevilabre*. Plants of the silky form of the Common Buttercup, *Ranunculus lappaceus*, var. *sub-sericeus*, were gathered in fruit. *R. Muelleri* has been confused with this plant, and wrongly recorded for Victoria of late years.

Proceeding a mile or two further, we came to the "Pretty Valley"—rather a misnomer when applied to a broad plain with no vegetation above a foot in height, and traversed by winding streams, the banks of which, in places, almost hid the water. The most notable plants along these banks were the Rock Heath, *Epacris petrophila*, a dwarf shrub with very pretty white flowers, having the corolla tube very short, Dwarf Buttercup, *R. Millanii*, and the Sky Lily, *Herpolirion*, in wet depressions. Here also grew the Coarse Daisy, *Brachycome scapiformis*, and another of the same genus, a supply of which, as I suspected it to be a new species, Mr. Clinton and I spent some time in gathering. I have handed it over to Mr. Morris, of the Herbarium, who has undertaken the authorship of the plant. One had to be careful, or, rather, to allow one's mount to exercise care, in crossing the small streams, whose banks consisted of moss and other matted vegetation. I found my horse wonderfully reliable, and one could tell, by the way he tested the ground for a footing, that he knew the tricks of Nature in those parts.

On our way back to the hut we took a route that led us across what appeared to me a basalt cap. It appeared to be limited to about a square mile in extent, and was strewn with broken, sharp-edged fragments of basalt. In the report of the Secretary for Mines, Victoria, for 1886, it is stated that the basaltic portion of the Bogong High Plains has an extreme length from north to south of four miles and a width of three miles, containing an area of about seven square miles. In the report of the Government Geologist of the same year appears the following:—"The basalt or lava forming the High Plains is here referred to the Older Volcanic overlying the Miocene or Middle Tertiary deposits, as shown by their fossil flora. The general structure is columnar. Portions of the surface have the appearance of being paved with five-sided blocks of stone, many acres being covered with jumbled heaps of five-sided logs of basalt. This basalt, which is in places 700 feet in thickness, with no apparent vents or pipes, is highly magnetic, and observers of the party were obliged to ascend trees to escape the influence of the rock on the instrument." The vegetation on this area was rather scanty. One part stands up higher than the rest, and to this the cattle men have

given the name "Ruined Castle." It was a good example of columnar formation, the brick-shaped fragments being heaped at the base as they fell away. We had company at the hut that night, Cr. Payne, of Omeo, and his friends having set up their tents near the hut. Anyone intending to go to the plains *via* Omeo could not do better than seek advice from Cr. Payne as to horses and equipment.

On the following day we made our way across to the edge of the scarp overlooking the tremendous gorge made by the Big River, and looked across to the Big Bogong, which rises perhaps a thousand feet higher than the plains, and is the highest peak in Victoria. Our way then led down the long spur fringing that gorge, and, owing to the undergrowth and fallen timber, it was difficult going till we got to Wild Dog Creek. On the next day we had a full day's ride to Mitta Mitta, about 38 miles, stopping for lunch at Blair's, at Lightning Creek. Mrs. Blair, as well as being a kindly hostess, is a nature poetess, many of whose poems have appeared in Australian magazines. Here we were shown a fine box of the Umbrella Fern, *Gleichenia lævigata*, which Mrs. Blair had rescued from the flood waters. At Granite Flat we passed the late residence of Mrs. M'Cann, now of Albury, who for years was a keen co-worker of "the Baron," as many labels on specimens in the National Herbarium show. She also delighted her friends by her flights into the poetic realm.

Mitta Mitta, at the junction of the Mitta River and the Snowy Creek, is a township which for many years was flourishing as the result of an enormous water-drive into an adjacent hill —the Pioneer Hydraulic mine. This deserted cut has walls in parts nearly 200 feet high, and is now full of plant growth, chiefly *Acacia pravissima*. The river scenery around this township is very fine, and, now that mining has ceased, the river flats are its chief asset. Very fine crops of maize are raised, and the village has the distinction of possessing the largest walnut tree in the State, one having a spread of over thirty yards. Three Acacias rarely gathered were seen —the Catkin Acacia, *A. Dallachiana*, in fruit on the high spurs, Buffalo Wattle, *A. Kettlewellia*, very abundant at Glen Wills, and bearing an immense weight of pods; the latter, together with Mitta Acacia, *A. Dawsonii*, were recorded for Victoria from specimens sent to me by Mr. Clinton, and determined by Mr. Maiden, the author of the former species. I was pleased to gather at Mitta Mitta fruiting specimens of *Pultenæa styphelioides*. This was considered to be *P. procumbens* when first sent in, but it must now be referred to *P. styphelioides*. Other plants of interest not mentioned above which were collected were Mountain Phebalium, *P. phylicifolium*, on the

top, all three Lomatias, intermingled, and blooming along the track at Glen Wills, *L. longifolia* making the best show. Along the side of Mount Wills and at other places of that altitude (4,000 feet) we passed through fine forests of that excellent timber tree, *Eucalyptus Sieberiana*, called "Woolly-butt" locally, though "Silver-top" is the name by which it should be known. A few miles up the Mitta from the township I gathered specimens of *Eucalyptus piperita*, Peppermint Stringy-bark. These, determined by Mr. St. John, constitute definite evidence for a record for Victoria which was previously doubtful. On the road cuttings near the town splendid masses of bloom of the Smaller Clematis, *C. microphylla*, revelled, and at the hotel a fine plant in flower adorned the fence. As to the fauna, several foxes were seen on the plateau, where also an enormous flock of Crows (or Ravens) suggested the possibility of beef scraps to tidy up.

[The paper was illustrated with a number of lantern slides, two of which are here reproduced. Omeo is not shown in the map; it is situated about half inch below right-hand corner.—ED. *Vict. Nat.*]

THE BUNYIP.

By E. J. DUNN, F.G.S.

AWAY back in the fifties and early sixties references to the "bunyip," both in conversation and in newspaper paragraphs, were far more frequent than at present, in fact, as that period of our history recedes the bunyip becomes more and more dim and mythical, and the question arises whether such a creature ever existed. So far as the aboriginals' huge monster with long ears, clothed with feathers, armed with sharp teeth, and dangerous to men, is concerned, it is a myth—an emanation of the blackfellow's ghost-haunted brain—though it may have been based on some substantial foundation. But as regards the strange animal seen at so many localities, both in Australia and Tasmania, at various times, and by many different white men, the case is otherwise, for their veracity and intelligence were often unquestionable. Among others, Major Couchman, formerly Secretary for Mines, Victoria, whom I knew well, is quoted by R. Brough Smyth as having seen a strange animal in the Malmsbury Reservoir.

As might be expected, descriptions of the animal by diverse observers did not tally in all particulars: still, certain characters are pronounced. The animal was described as amphibious. It inhabited swamps, lagoons, water-holes, rivers, and lakes; was a strong swimmer and diver; its length was from three to six feet; head was round; it was clothed with fur of dark or

black colour. When swimming the head and a portion of the back were exposed. Flappers are referred to by some observers. Summing up these various characteristics, there is one existing animal that corresponds: the seal.

That seals formerly tenanted our rivers, though only temporarily, perhaps, I have had personal experience, for in 1856, in company with two families, I left Goulburn, N.S.W., and proceeded to Beechworth, Victoria, where we arrived on the 31st of October. We travelled in two tilted drays, each drawn by two horses. There were no roads—simply tracks, which wound their way between the trees; no bridges, but where large streams were crossed there were punts. On arriving at Gundagai the Murrumbidgee River was in full flood, and the punt could not be worked, so we camped for a day or two on the outskirts of the township until the water subsided sufficiently for the punt to be used, then we crossed over to this side of the river. On reaching this bank the track was so wet and muddy that it was decided to camp for the day and allow it to dry a little. While so camped we heard a strange "moo-ing" sound, something like the lowing of a calf, in the river, made by many individuals. We were all astonished, and went hurriedly to the river brink to see what made the noise. To our surprise there was a herd of animals swimming in the middle of the stream, and making good progress up-stream against a swift current. One of the party had a shotgun, which he loaded and discharged at them two or three times before they had all passed. We boys ran and got lines and fish-hooks, which we baited with meat, and cast towards the strange animals in the vain hope of catching one. Although making good headway against the stream, the herd took some little time to pass, as there were many of them. My recollection of these animals is that they had round heads, with no visible ears, but eyes that could be seen, dark-coloured fur, length of animals about five feet; while swimming the head and top of the back were exposed above the water. Up to that time I had not seen seals, but since then many have come under observation, and I have no doubt the animals I saw in the Murrumbigdee River were seals. Taking into account the windings of the Murray and Murrumbidgee Rivers, Gundagai would be about 2,000 miles from the sea (estimated).

On reaching Albury, on the Murray, which then consisted of three or four houses only, we saw a barge tied up to trees on the Victorian bank of the river, near Hovell's marked tree. In the previous year (1855) Captain Cadell made his first voyage up the Murray as far as Albury, and this was one of his barges, built, I believe, at Albury. We crossed the Murray by a three-mile boat trip to Wodonga.

Apparently, in the early days of colonization, when settlers were few and steam traffic had not been established on the rivers, seals from the coast made excursions up the rivers when they were in flood. Perhaps through sickness, or accident, individuals became separated from the herd and located themselves in lagoons and water-holes in lonely spots, and these gave rise to the bunyip stories. The main herds probably soon returned to the sea; while in the rivers they might have subsisted on the fish. When steamers began to ply on the Murray, such timid animals as seals would cease to frequent the river, and this would account for the simultaneous disappearance of the seals and the bunyip stories. The seal may have been the foundation on which both the white man's and the blackfellow's stories of the bunyip were built.

[REFERENCES:—"Aborigines of Victoria," R. Brough Smyth, 1878, vol. i., p. 435; "The Aborigines of Australia," J. Worsnop, 1897, p. 168; "Natives of Australia," N. W. Thomas, 1906, p. 244.]

[Some years ago considerable controversy took place in the papers regarding the bunyip. At the time Mr. Dudley Le Souëf, C.M.Z.S., Director of the Melbourne Zoological Gardens, furnished a reply, quoted in the *Naturalist* for July, 1917 (vol. xxxiv., p. 55), stating that the bunyip was no doubt the well-known seal of our southern coast-line, at one time much more plentiful than now.—ED. *Vict. Nat.*]

VISIT TO THE NATIONAL HERBARIUM.

A PARTY of about twenty members attended the excursion to the National Herbarium, South Yarra, on Saturday, 30th June. After some general remarks on the history of the institution, the members were shown the methods of keeping and working the collections. The Australian collections were viewed, after which the visitors interested themselves in the specimens collected by Banks and Solander during Captain Cook's voyage in 1770, the specimens collected by Petiver in 1668, as well as a small collection of the introduced weeds and poisonous plants. The main library was examined and the books of note were shown. These included Saccardo's "Sylloge Fungorum," a set of *Curtis's Botanical Magazine*, Fitzgerald's "Orchids," and the various works by Australian authors. The room housing the books on economic botany was next visited, and the works of the various Departments of Agriculture, as well as several finely-illustrated books on cultivated plants, examined. The ex-Australian collections were next visited, and here books by the pre-Linnean authors, O. Brunsel's "Herbarium Icones" (1532), Fuch's "Historia

Stirpium" (1542), Grew's "Anatomy of Plants" (1682), and the box in which the bones of the explorers Burke and Wills were brought from Cooper's Creek, Central Australia, proved of more than passing interest. The Herbarium was established in 1857, and ranks amongst the larger Herbaria of the world. The combined Australian and ex-Australian plants number nearly 1½ million sheets of specimens, whilst the library contains about 9,000 volumes.—J. W. Audas, F.L.S., P. F. Morris.

[Further notes on the National Herbarium will be found in a paper by the late Mr. J. R. Tovey, in the *Victorian Naturalist* for January, 1908 (vol. xxiv., p. 146.)—Ed. *Vict. Nat.*]

An Exciting Contest Between two Lizards.—When going through the vegetable garden, about 10 o'clock on the 15th of November last, my attention was drawn to two Stump-tailed Lizards that were in my track. It is, however, not unusual to see two of these lizards together in the early part of November, as it is their pairing time; but the actions of these two were out of the natural order of things. I should mention that the Stump-tailed Lizard, *Trachysaurus rugosus*, Gray, is a heavily-built creature, about twelve inches in length, and weighing from one and a half to two pounds. The lizards appeared to be fighting, and one of the combatants (both were males) had all the scales bitten off right across the top of the head. This one I will call A., and it seemed that B. had a death-grip on the corner of the head and the back of the jaw-bone. A. appeared to be helpless. The bodies of both were bent round in a circular position, and every movement that was made was forward in a circle about one foot in diameter. They kept going in the same circle for some minutes, and at intervals B. would put all his strength into his jaws, and I thought sometimes, by the powerful grip that he had and used, that he would break the crown of the head of A. This went on for some minutes, till they got exhausted, and then B. let go his grip. Both lizards lay quiet for a little while, and their sides could be seen working for breath, like a horse after a race. When they recovered their breathing they again circled round one another, always going in the same direction to the left—and in the same little circle. Both lizards now kept their mouths wide open, and both tried to get a grip, if possible. All at once A. got hold of B. by the front foot and held it fast; it seemed to give pain, for he shut his mouth and did not care to move much till A. let go of the foot. They were now panting for breath again. As soon as they recovered they again circled round one another, with their mouths wide open. The next

grip was in each other's mouths. The one that had the bottom jaw seemed to have the best grip to cause pain, for that one (B.) could grip the tongue. They soon let go and circled round again, each with mouths extended widely open. This time the attack was different. A. got hold of B. in the flank; he got a good grip, and was able to shake his antagonist like a dog would, and you could hear the teeth gripping on the scales. When A. let go they were again exhausted. When the gong sounded again for the next round, mouths were opened, and they circled round each other as close as they could; then B. got hold of A. on the back part of the head and held on for a while. The next grip was in each other's mouths, A. getting the bottom jaw. At the next grip B. got the hind foot of A. In the next round A. got B. behind the front leg. Up till then the two lizards had fought bravely, neither flinching from the other. I had sat watching the contest for nearly an hour, and wondered how much longer it would be prolonged, when both of them lifted their heads, looked about for a short time, and then all at once made off as fast as their legs would carry them. They ran into the vegetables two or three yards away, and then parted company. Thus ended one of the most courageous contests that could be witnessed for reptiles of this class. I think they must have fought for at least two hours, as I had watched them for nearly an hour, and by the execution done before I saw them I think the contest must have occupied quite that time. I have no idea what made them leave off the fight, for they took no notice of me, and when they made off they were both in the same mind. I have lived here in their natural home for nearly fifty years, and this is the first encounter of the kind that I have witnessed, or even heard of.—James Hill. Westell Farm, Kewell.

"Memoirs of the Geological Survey of Victoria: No. 14—The Ballarat Goldfield."—The survey of the Ballarat goldfield, now practically closed down, has occupied many years, owing to the intricate nature of the work and the extensive workings to be investigated. The memoir is by Mr. W. Baragwanath, the present Director of the Geological Survey Branch. It is most comprehensive in the information given, and is well illustrated with plans and figures. A geological map (coloured), with sections, is given of the area under review—about fifteen square miles. Some of the records of the different mines read like fairy tales, and the total gold obtained from the field is, as nearly as can be ascertained, of the value of £50,000,000. At first an alluvial field, it gradually became a quartz-producing area. Mr. Baragwanath says: "The main features of the Ballarat field are—first, that the auriferous quartz is associated with certain favourable zones

of beds; and secondly, that payable quartz in the Ballarat East zone is found only in those beds of the favourable zones that dip east, while in the Ballarat West zone only in those that dip west. The Ballarat East and Ballarat West zones have not been correlated, nor has any clue been found to indicate the reason for the association between the dip of the beds and the gold contents of the quartz reefs that traverse them." Gold-mining at Ballarat dates from August, 1851, when payable gold was discovered at "Golden Point" (the intersection of Barkly and Young streets, Ballarat East), where an obelisk now stands marking the spot. Ballarat was famous for the richness of its early workings; unfortunately, owing to the excitement of the time, few records are now available, but it is known that instances of parties of four men sharing, day after day, 10 ozs. of gold per man were not uncommon. Nuggets were one of the features of the early mining days. In January, 1853, Canadian Gully yielded three nuggets, each over 1,000 ozs. The largest, the celebrated "Welcome Nugget," was found in June, 1858, at Bakery Hill, not far from where the Ballarat East railway station now stands, at a depth of 180 feet, and weighed 2,217 ozs., valued at £9,325. The last large nugget recorded was found in the Midas mine in August, 1887, and weighed 617 ozs. A number of quartz specimens—that is, masses of gold with more or less included quartz, are recorded, varying from 500 ozs. to 22 ozs. A large proportion of these came from the North Woah Hawp and adjacent mines at Ballarat East. The individual history of each mine is given in the Memoir, hence it is a valuable record on which to base calculations should ever an attempt be made to reopen some of the mines. The depth of sinking, influx of water, and heavier working expenses have probably doomed many of the mines to extinction. However, the 250 foolscap pages covered by the memoir will well repay perusal, and stand as a splendid piece of painstaking work. It is obtainable from the Mines Department at five shillings.

BIRD NOTES.

Ground-Thrushes in the Botanic Gardens.—For the bird-lover, as well as the botanist, Melbourne Botanic Gardens may be called "happy hunting-grounds." A ramble through the gardens in the spring or early summer is a rare pleasure, and richer in records of birds seen and heard than a day in the bush may be. Mr. P. R. H. St. John has, for many years, kept a register of the species, residents and visitors, which, I hope, will some day be published in the *Naturalist*, with "field notes." It is a most valuable and interesting record,

PLATE VII.

AUSTRALIAN GROUND-THRUSH (*Oreocincla lunulata*) AT NEST, IN BOTANIC GARDENS, MELBOURNE.

Photo. CHAS. BARRETT.

Early in August Mr. St. John kindly advised me that a pair of Australian Ground-Thrushes, *Oreocincla lunulata*, had a nest, with young, in a secluded "corner" of the Gardens. Next morning I called upon the Thrush family, and, despite dull weather, exposed a few plates. The nest was in shadow, on the broad leaf of a Cabbage-tree Palm, *Livistona australis*, about four feet from the ground. An excellent situation for photography; but "snapshots" in the shade, on a dull day, of course, were failures.

Two days later, with propitious weather to foster hope, I tried again, and succeeded. The mother bird (?) was a trifle anxious at first, but soon she gained confidence, and allowed me to move the camera near and focus finely, while she remained perched on the rim of the nest. I was able to give a time exposure, and thus secure a unique portrait of *O. lunulata* "at home," within sound almost of tram-car bells!

As a boy I became familiar with the silent, shadow-loving Thrush, which was fairly abundant among the tea-tree (Leptospermum) groves between Hampton and Beaumaris; now I seldom see it on my seaside rambles, though it is still far from rare in the hill districts.

In the Botanic Gardens the Ground-Thrushes have a sanctuary, where they may flourish long after their race has gone for ever from the haunts of week-enders and picnic parties along the coast near Melbourne. One sees the "natives" foraging on the lawns near, but not associating with, the English Song-Thrush. They hunt in the open, but find most of their food, perhaps, among decaying leaves beneath trees and bushes that grow close to the lawns.

The friendly pair did not allow my presence to interfere with their parental duties. One, at least, hunted assiduously, and twice in the course of ten minutes brought a beakful of fat worms to the fledgelings, which made rather a "crowd" in the nest. The other bird foraged in the vicinity, but seemed to have poor luck, and often ate what it did discover. I did not hear the Thrushes' song -a low, sweet strain, which usually is uttered just after dawn or when the sun is setting; but, when Mr. St. John first guided me to the nest, a run of curious trilling notes betrayed the mother bird's anxiety for the safety of her two chicks. Thereafter, both she and her mate were silent.—Charles Barrett.

"A Census of Victorian Plants."—This work of about 100 pages, containing the vernacular names for Victorian plants adopted by the Plant Names Committee of the Field Naturalists' Club and other useful information for botanists, is now in the press, and will be published about the end of the month. The price will be three shillings and sixpence in cloth.

Handbook for the Melbourne Meeting of the Pan-Pacific Science Congress, 1923.—The handbook prepared for the use of visiting and local members of the Pan-Pacific Science Congress held in Melbourne last month was a very fine production, containing not only details of the meetings, but outlines of the excursions, which were really essays of great value, and in several instances illustrated with diagrams and maps. In fact, the information given cannot be obtained from any one publication, and the bibliographies included will save students an immense amount of time in the future; for instance, that attached to the Bacchus Marsh excursion includes no less than eighty-four items, even listing references in the *Victorian Naturalist.*

A Memorial Wattle.—The Melbourne Botanical Gardens was on Saturday, 1st September, the scene of an impressive ceremony, when the Wattle League planted a wattle in memory of the late Mr. J. Cronin, who had been president of the League for a number of years, and Director of the Gardens since 1909. Mrs. G. H. James, president of the League, said that, although Mr. Cronin had been a great man in the positions he had occupied, his tastes were simple, and a tree was such a memorial as he would have chosen could he have been asked what he desired. She asked Mr. W. Laidlaw, acting Director of the Gardens, to plant an *Acacia elata*, the Cedar Wattle of New South Wales, which, she hoped, would grow into a fine specimen, and thus keep green the memory of one who had done much in an unobtrusive way to make the Gardens the delight they are at the present time. The Cedar Wattle is one of the finest of the genus; specimens on the Western Lawn are over forty feet high, and covered with a wealth of bloom in January and February in each year. The spot chosen for the Cronin memorial tree is on the Eastern Lawn, not far from the groups of palms. Addresses were delivered by Sir James Barrett, a member of the Gardens Advisory Committee; by the Rev. A. F. C. Gates, of Lara, who spoke of the great worth of Mr. Cronin as a man, a friend, and a helper in regard to questions dealing with horticulture; by Mr. E. E. Pescott, F.L.S., vice-president of the League, who said that Mr. Cronin's talents as a hybridizer and raiser of new varieties of gardeners' flowers would have brought him a large income had he desired such, but he was content to give his best work without reward for the credit of the gardens he loved so well. Among those present to pay their tribute to the memory of a fellow-member were members of the Field Naturalists' Club, Royal Horticultural Society, Victorian Horticultural Society, the National Rose Society, and the Carnation and Dahlia Society.

Vol. XL.—No. 6. October, 1923.

The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria.

Published 4th October, 1923.

Hon. Editor: F. G. A. BARNARD, Esq.

The Author of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 8th OCTOBER, 1923.

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBER—	PROPOSER.	SECONDER.
Mr. Thomas Kerr, Box 2,515, Spencer-st. P.O., Melbourne.	Mr. H. Hughes.	Mr. C. Oke.
Mr. J. R. Leslie, 4 Lara-street, South Yarra.	Mr. J. A. Kershaw.	Mr. C. Oke.
Rev. E. Nye, 169 Punt-road, Prahran.	Mr. F. G. A. Barnard.	Mr. C. Oke.
Mr. Edw. E. Nye, 169 Punt-road, Prahran.	Mr. F. G. A. Barnard.	Mr. C. Oke.

3. Nominations for Membership.

4. General Business.

5. Remarks by Exhibitors relative to their Specimens.

   Ten minutes' adjournment for discussion of Exhibits.

6. Reading of Papers and Discussion thereon.

   By Mr. D. J. Paton.—"The Plants of the Whipstick, Bendigo."

7. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

   Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and *Naturalist*. Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Club year ended on 30th April last. Any subscriptions overdue should be forwarded to the Hon. Treasurer *at once*.

Subscriptions for 1923-4 are now due, and should be paid to the Hon. Treasurer as early as possible.

The Victorian Naturalist.

Vol. XL.—No. 6. OCTOBER 4, 1923. No. 478.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday, 10th September, 1923.

The president, Mr. C. Daley, B.A., F.L.S., occupied the chair, and about fifty members and visitors were present.

The president said that since the last meeting of the Club one of its oldest members had passed away in the person of Mr. W. H. Dudley Le Souëf, C.M.Z.S. In its earlier days Mr. Le Souëf had been a very active member of the Club, contributing papers and interesting exhibits to its meetings. It would be remembered that some four years ago a resolution of sympathy had been conveyed to Mr. Le Souëf on the occasion of an attack by footpads, by which he was seriously injured, and it is thought that this attack had considerably shortened his life. He moved that the sympathy of the members be conveyed to Mrs. Le Souëf and family in their bereavement.

The motion was seconded and carried in silence, all standing.

REPORTS.

A report of the excursion to South Morang on Saturday, 18th August, was given by Mr. F. G. A. Barnard, who acted as leader in the unavoidable absence of Dr. Sutton. He reported a good attendance of members and a lovely afternoon after a spell of wet weather. The object of the excursion was to see the Silver Wattles along the Plenty River in bloom, but it was found that, owing to the previous cold weather, they were not so forward as usual at that date. However, a number of Golden Wattles, *Acacia pycnantha*, were seen in full flower, and two of the smaller kinds, *A. acinacea*, Gold-dust Wattle, and *A. diffusa*, the Spreading Wattle, were in fair order. Rambling over the hills towards the Diamond Creek road, a few spring flowers were met with, the most noticeable being *Lissanthe* (*Styphelia*) *strigosa*, the Peach-heath, and the beautiful white stemless Scented Sundew, *Drosera Whittakeri*, but evidently the late winter had greatly interfered with the early flowering of the native plants.

A report of the excursion to Heidelberg for pond-life on Saturday, 8th September, was given by the leader, Mr. J. Stickland, who said that only a small party attended, but the results were very good. There had not been time to fully examine all the material yet, but the results would be published in the *Naturalist*.

The president said that, owing to the receipt of an invitation

from the Wattle League to attend the planting of a memorial tree at the Botanical Gardens, the excursion to Cheeseman's Nursery had been postponed. The proceedings at the Gardens were fully reported in the current *Naturalist*.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Hilda Gabriel, Walmer-street, Kew, and Mr. A. C. Collins, 380 Flinders-lane, Melbourne, were duly elected as ordinary members of the Club.

GENERAL BUSINESS.

Mr. A. G. Brown referred to the effort being made by the Noojee Progress Association to secure the reservation of beauty spots in the district, and asked if the Club would assist in the matter. It was referred to the committee to take the necessary action.

PAPERS READ.

1. By Mr. F. M. Chapman, A.L.S., entitled "The Fossiliferous Beds of Violet Creek, near Hamilton."

The author stated that the locality as a source of Janjukian and Kalimnan fossils was a new record. The only fossil found previously was discovered many years ago by the Geological Survey; this was a coral, presumably of Balcombian age—*Deltocyathus viola*. Thus the entire succession of the Tertiaries, from Balcombian to Kalimnan, seems to occur here, as at Muddy Creek. The Janjukian bed was described as a polyzoal and foraminifera limestone, whilst the Kalimnan was a tenacious fossiliferous ironstone.

2. By Mr. S. Butler (communicated by Mr. J. Searle), entitled "Notes on Spiders."

The author, with the aid of a large number of lantern slides, gave a brief outline of the general anatomy, both external and internal, of spiders, their mode of living, spinning, egg-laying, &c. He also showed the differences between spiders and the other groups of the Arachnida. Reference was made to the various families of spiders found in Australia, showing, by means of lantern slides, the differences between the eyes, spinnerets, claws, &c., by which the families are distinguished.

Some discussion ensued, in which Messrs. H. W. Davey, F.E.S., F. Chapman, A.L.S., J. Searle, and C. Oke took part.

Mr. Davey asked the author if he considered the Red-backed Spider, *Latrodectus scelio*, to be a really poisonous spider.

Mr. C. Oke congratulated the author on the amount of information he had given on what was usually regarded as a

difficult subject, and hoped that he would continue his investigations regarding the classification of the indigenous species of spiders. He expressed the opinion that the bite of the Red-backed Spider was not so dangerous as is usually supposed, and little worse than the sting of the Red Bull-ant.

Mr. F. Chapman expressed the pleasure with which he had listened to the paper and the way the subject had been treated, spiders being regarded by most people as repulsive creatures which should be avoided. He said if anyone cared to try experiments with the Red-backed Spider he could supply specimens, as they were very common about Balwyn.

Mr. J. Searle congratulated the author on the interest of his paper, and recalled some experiments made by the late Mr. C. Frost, who caused the Red-backed Spider to bite the combs of young chickens, when the only effect was that after a chicken had been bitten several times it showed signs of illness, but no fatal cases occurred.

Mr. G. Coghill said that he had listened to the paper with much interest, and thought that the Club was greatly indebted to Mr. Butler for reading the paper before the Club and for the excellent lantern slides he had exhibited. He moved a vote of thanks to Mr. Butler, which was carried by acclamation.

NATURAL HISTORY NOTE.

Mr. L. Thorn read a short note referring to the five species of Silvery Wattle Moths, of which he exhibited specimens of the larvæ, pupæ, and perfect insects.

EXHIBITS.

By Mr. F. G. A. Barnard.—Flowering branch of *Acacia Howitti*, grown in his garden at East Kew.

By Mr. F. Chapman, A.L.S.—Fossiliferous ironstone from the bed of Violet Creek, near Hamilton, Western Victoria—a new locality record; polyzoal limestone from Violet Creek, lower down stream in the bank of the creek—a new locality record; also type-slides of Foraminifera (19 spp.) and Polyzoa (11 spp).

By Mr. G. Coghill.—Flowering branches of *Thryptomene Mitchelliana*, Bushy Heath-myrtle, grown in his garden at Canterbury.

By Mr. C. W. D'Alton.—Double-flowering spike of *Epacris impressa*, Labill., Common Heath, collected by exhibitor at Mount Difficult, in the Grampians, 6/9/23.

By Mr. C. Oke.—Case of insects from the Natya excursion, containing about 200 species of beetles and 25 species of moths; several species of spiders, with dissections of same; three

species of Cordyceps fungi, on the following hosts:—*Cordyceps Gunnii* on Porina larvæ (one of the Hepalid moths), Cordyceps (sp. ?) on an Elaterid (click-beetle) larva, and Cordyceps (sp. ?) growing from a Cup-moth cocoon.

By Mr. J. Searle.—The following spiders, or parts, under the microscope, in illustration of Mr. Butler's paper:—Gasterocantha, sp., *Arachnura Higginsii*, male spider to show pedipalps, and pedipalps of male spider.

By Mr. L. Thorn.—Five species of Silvery Wattle Moths of the genus Thalaina, viz.:—*T. clara, T. angulosa, T. punctilinea, T. inscripta,* and *T. selena.*

By Mr. H. B. Williamson, F.L.S.—Specimens of *Ceratophyllum demersum*, L., Common Horn-wort, a water plant collected by Mr. T. S. Hart, M.A., at Pound Swamp, Bairnsdale, new for East; also section, under microscope, of phyllode and gland of *Acacia pycnantha,* Golden Wattle.

After the usual conversazione the meeting terminated.

The Late Mrs. W. Martin.—A few weeks ago we learned with deep regret that Mrs. Martin had passed away at her home, "Weebar," Drouin, on the 14th March last. Mrs. Martin, better known to the earlier members of the Field Naturalists' Club as Miss F. M. Campbell, took a great interest in the doings of the Club in its early years. She was an enthusiastic collector of fungi, and some notes about the fungi seen during a Club excursion to the Olinda Creek will be found in the *Naturalist* for July, 1884. She contributed one or two short papers to the meetings, and was a frequent exhibitor of macrofungi. As related in a recent *Naturalist*, she had the honour of forwarding to England the first fruiting specimen of the fungus *Polyporus mylittæ*, thus clearing up the nature of that curious substance known as "Native Bread," which had puzzled botanists for years. Her home at Drouin, to which she removed in 1892, was noted for its garden of unusual plants. Her last illness was a long and painful one. Her husband had predeceased her by some nine years. By her death the Presbyterian Church of Victoria will benefit financially to a considerable extent.

To Our Members.—The editor regrets that Natural History Notes have not come to hand as freely as was expected when the enlargement of the *Naturalist* was decided upon. It is hoped that this will be remedied before long. He specially desires that all matter be in his hands by the 15th of each month.

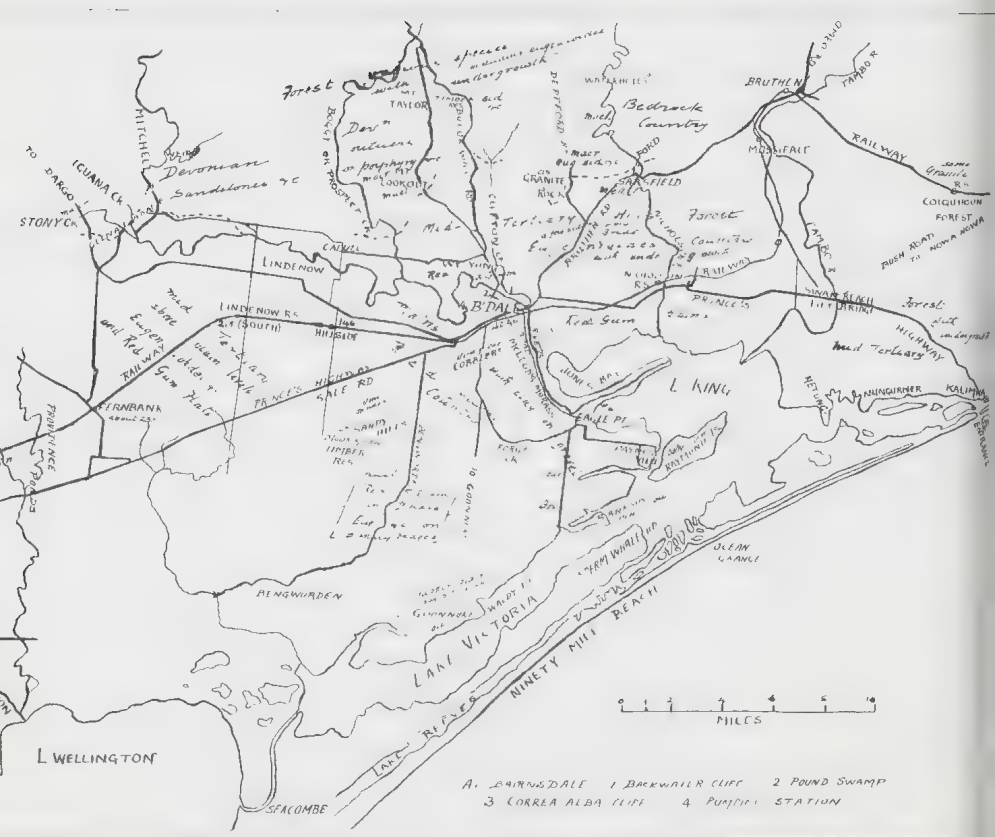
THE LATE MR. W. H. D. LE SOUEF, C.M.Z.S.

AUSTRALIAN natural history has lost, by the death of Mr. W. H. Dudley Le Souëf, Director of the Melbourne Zoological Gardens, one of its most ardent investigators and exponents. Mr. Le Souëf passed away at his home at the Gardens after a long illness on Thursday, 6th September, at the age of 66. It will be remembered that about four years ago he was the victim of a murderous attack by footpads, and this attack was no doubt the cause of the indifferent health from which he had suffered for some time. Mr. Le Souëf had travelled far and wide through the Australian States in search of specimens for the Gardens or to endeavour to solve difficulties regarding native animals, birds, &c. He was always willing to bring natural history before an audience, and it is doubtful whether anyone in Australia has done better service in fostering a love for Nature in its many phases, especially among young people, than Mr. Le Souëf. His lectures were generally illustrated by lantern slides from his own photographs, which made them doubly interesting. Though not a "foundation member" of the Field Naturalists' Club, he early joined its ranks, and for many years contributed interesting accounts of his various trips to its meetings. He was elected a member of the committee in 1885, and continued to serve in that capacity for some years. In 1900–1 he acted as co-secretary with the Rev. J. S. Hart, M.A., now Dean of Melbourne, and in 1901-2 in conjunction with the late Rev. W. Fielder. His papers in the *Naturalist* include visits to Mallacoota, the Mallee, Riverina, Queensland, Western Australia, &c. In these accounts his principal leaning was toward birds, but little escaped his observing eye, and other branches of natural history were not overlooked. He inherited his natural history tastes from his father, and shared them with his brothers. He also had a considerable acquaintance with Australian ethnology. He took part in the Club expeditions to King Island (1887) and the Kent Group (1890), and later made a trip to Albatross Island with the late Mr. H. P. C. Ashworth. He was an authority on snakes, and compiled the list of Victorian reptiles published in the first volume of the *Naturalist* (1884). He was joint author with Mr. A. H. S. Lucas, M.A., B.Sc., first editor of the *Naturalist*, of two standard works—"The Animals of Australia" and "The Birds of Australia." In "Wild Life in Australia" he brought together descriptions of his various trips published in the *Naturalist* and *The Emu*, &c., in a well-illustrated volume. His love of birds led him to become one of the founders of the Australasian Ornithologists' Union and a frequent contributor to its magazine, *The Emu*. Having been for many years Assistant Director of the Zoological

Gardens, in 1902 he was appointed Director, in succession to his father, and under his management it became the most important collection of animals, birds, &c., in Australia, and had few rivals in other countries. This office afforded him opportunities of visiting places outside Australia in the quest for new specimens for the Gardens, thus increasing his knowledge of the animals of the world and bringing him in touch with scientific societies, &c., in many countries. He had amassed a very large private collection of natural history objects of all kinds, and was ever willing to exhibit his treasures to anyone seeking information. The Field Naturalists' Club was indebted to him on many occasions for acting as leader on visits to the Gardens, when his remarks were always listened to with great interest. A large number of friends assembled at the Melbourne Cemetery on Friday, 7th ult., to pay their last respects to his remains, among whom were several representative members of the Field Naturalists' Club and the other societies in which he was interested. At the last meeting of the council of the Royal Zoological and Acclimatization Society a resolution was passed conveying the sympathy of the council to Mrs. Le Souëf and family, and placing on record "its high appreciation of the very valuable services rendered by the late Director, Mr. W. H. D. Le Souëf, through a long series of years, and expresses profound regret at the loss of a valued officer whose efforts have secured the splendid collection of exhibits now on view at the Zoological Gardens." One of his sons is an associate member of the Field Naturalists' Club, and, we trust, will in time become a worthy representative of his father, who was regarded by all who knew him as a genial, kindly man and a warm-hearted friend.

Microscopy 150 Years Ago.—A member of the Field Naturalists' Club has in his library a curious old book of 440 pages, published in London in 1764 (second edition), with an elaborate title page of 28 closely-printed lines. It consists of two parts—firstly, "Employment for the Microscope," explaining the method of crystallizing various salts from solutions and watching the formation of the crystals under the microscope; and, secondly, "An Account of Various Animalculæ." Both parts are well illustrated, there being 17 plates of engravings on copper of various objects. The author was Henry Baker, a fellow, and some time president, of the Royal Society of London. Being printed with the long s (like f) it is somewhat difficult to read, but it gives an excellent idea of the state of microscopy 150 years ago.

PLATE VIII.



MAP OF BAIRNSDALE DISTRICT.

BOTANICAL NOTES ABOUT BAIRNSDALE AND THE EASTERN LAKES.

By T. S. HART, M.A., B.C.E.

(*Read before the Field Naturalists' Club of Victoria, 11th June, 1923.*)

To present the chief points of botanical interest in this district, and to avoid undue length, I propose to refer to the chief types of vegetation, and among individual species to those mainly which do not occur in the western parts of the State, to those not recorded in the "Key" as eastern, and to others about which there is some point of interest. Many of the far eastern Victorian plants do not reach as far west as this.

As a preliminary climatic note, the average rainfall is about 28 inches per annum at Bairnsdale (26 by another record), well distributed, but with the highest averages in September and January, according to the detailed information available over a part of the period of the records. The intervening months are sufficiently rainy to make the spring and early summer, by a small amount, the part of the year with highest rainfall. The lowest averages are in April and August, the dry April contrasting with Melbourne, indicating that the rains of that season do not readily penetrate so far to the east. A somewhat drier belt of country runs through Sale and Maffra, on the west. To the east the rainfall gradually increases, though there are relatively dry areas. In individual years the heaviest rain or dryness may occur in any month. In the native vegetation plants of dry situations must be able to stand summer droughts; in the valleys there is more luxuriant growth, due to all-the-year-round adequacy of moisture, and here eastern types are more abundant.

It may be noticed that the average rainfall is about that of Kew, but the number of rainy days appreciably less.

THE RED GUM PLAINS.—These are grass land with trees and little shrubbery, the prevalent eucalypt being the Forest Red Gum, *Eucalyptus tereticornis*, with occasionally Swamp Gums, *E. ovata*, at wetter places, and subordinate Yellow Box, *E. melliodora*, and But-But, *E. Bridgesiana*, occasionally, and at places not typical the Gippsland Box, *E. Bosistoana*. The Erect Sheoke, *Casuarina suberosa*, is plentiful, but about Bairnsdale *C. stricta* is absent from the general run of the plains, being found further to the south and in two places on the edge of the steep fall to the river above Bairnsdale. As it is common at Sale and Maffra, we may conclude that the slightly greater rainfall is restricting it to drier situations, whereas in some of the drier country *C. suberosa* is seen to prefer the lower and moister position at the foot of a hill slope. Other trees are

Black Wattle, *Acacia mollissima*, and Lightwood, *Acacia implexa*; occasionally, *Banksia marginata*.

For the smaller plants a good locality is west of the Sale road crossing. Among the orchids are *Pterostylis falcata*, *Diuris punctata*, *Prasophyllum fuscum*, *Pterostylis curta*, *Eriochilus autumnalis*, and others. *Viola betonicifolia* is sometimes very fine, and apparently paler in the wetter situations. The Sundews are *Drosera peltata*. I have not seen *D. Whittakeri* here. *Bartlingia gracilis* occurs at a paddock on the Sale road, and quite deserves its specific name.

The plains being nearly flat, and with a clay subsoil, the water lies about in places. In the borrow pits of the railway and in other places we may see the curious *Philydrum lanuginosum*, the sole Victorian representative of a very small family of plants. At first I considered the possibility of its having been introduced, but, as it occurs in many natural swamps, well away from the railway and over a wide area, the idea may be dismissed. It may attain a height of five feet in a natural swamp, with as many as 150 buds on a slightly-branched inflorescence, but it usually opens only one or two of its yellow flowers on a stem or branch at once, and loses in showiness. *Damasonium australe* also occurs in pools on the plains and river flats; but its relative, Alisma, belongs to the river backwaters. *Goodenia paniculata* likes the moist places, and in the pools of an intermittent creek is the Large Marshwort, *Limnanthemum geminatum*.

Close south-west of Bairnsdale the plain is cut through by the steep-sided Cobbler's Gully. On the well-drained, sandy slopes are Manna Gums of the Brighton type, *E. viminalis*, and White Sallee, *E. coriacea*. Eagle Point Park, six miles down the river, may also be considered as a dissected edge of the plain. A bluff, rising steeply to 90 feet above the river, affords a fine view of the lake and more distant country. Behind is a hollow in which a small lagoon, used by stock, carries Azolla, Lemna, perhaps Wolffia, and Riccia, floating on its surface; among its fixed plants is a form of *Ranunculus rivularis*, probably variety *inundatus*. At another part, independent of this valley, is a salt marsh. The Swamp Paper-bark Tea-tree, *Melaleuca ericifolia*, on its margin carries *Cassytha phaeolasia*, Long-spiked Dodder Laurel. The trees of the park are Red Gums, Manna Gum of the Brighton type, and a Box best placed as *E. Bosistoana*. Bursaria is abundant in good specimens. It is called Myrtle locally (whence the names Myrtle Point and Myrtle Gully in other parts of the district). Hymenanthera and *Kunzea pedunculatis* are other abundant shrubs. *Clematis glycinoides* is abundant; it is the common Clematis of the district. *Pterostylis concinna* and *Corysanthes*

pruinosa occur. The dryness of the surface soil of the hills is indicated by a succulent Claytonia and *Stellaria pungens*.

On the bluff are the furthest inland specimens of Coast Tea-tree, looking quite natural, but possibly introduced, as Tyers had a residence here. A Cassia, locally called "Glory Bush," is certainly a garden relic, and has contributed, no doubt, to many Bairnsdale gardens. *Senecio mikanioides* is also an escape, and should be watched lest it become a nuisance.

THE LOWER HILLS. These are easily seen north and north-east of Bairnsdale, on the Bulumwaal and Bruthen roads. Being composed of the Tertiary sandstones and associated materials, they have a light, well-drained soil, affording a good root-run, and are well covered with trees and shrubbery, with smaller growth. White Stringybark, *Eucalyptus eugenioides*, is the prevalent species, with Red Box, *E. polyanthemos*, But-But, and some *E. goniocalyx*. Manuka, *Leptospermum scoparium*, and *Kunzea pedunculatis* are common. The latter, locally called Black Tea-tree, is acquiring a bad reputation for re-establishing itself on cleared lands and becoming rather a pest. Well grown, it is said to form good fishing rods. Here are also the close-flowered Geebung, *Persoonia confertiflora*, *Bossiæa microphylla*, *Hibbertia linearis*; *H. Billardieri*, and *Phyllanthus thymoides*. The curious little *Pomax umbellata*, with its coherent fruits, is a proved poison plant, yielding hydrocyanic acid; but its small size makes it unimportant. The Pinkeyes, though coming within the comprehensive *Tetratheca ericifolia*, are not typical for that species. *Clematis aristata* occurs, but it is not very abundant. Among orchids, the most interesting are *Chiloglottis diphylla* and *Corysanthes fimbriata*, both autumn or winter flowering.

The Red or Saw-leaved Honeysuckle appears at places in the *eugenioides* country, but it is especially characteristic of another and poorer variety of the light Tertiary soils. South-west of Bairnsdale, in sandy ridges, there occur, with this Banksia, Manna Gums of the Brighton type and Howitt's "*Eucalyptus amygdalina*, variety *c*," to which we may give the name "Sandhill Peppermint," with an undergrowth of Ricinocarpus, *Leptospermum myrsinoides*, *Acacia Oxycedrus* with *Leucopogon ericoides*, locally called Heather, *Correa speciosa*, of the red-flowered variety, and *Bossiæa heterophylla*, an autumn-flowering, broom-like Pea with few leaves. At one part *Caleya major* and *minor* both occur, the latter flowering early in December. This is very poor country; in some of it I have never seen stock. Kangaroo are sometimes seen. At the end towards Bairnsdale is a charcoal-burning plant using iron kilns. Yertchuk, *E. consideniana*, occurs, in part, at least, below the driest ground.

With this may be placed the country passed through on the railway west of Fernbank, on the rise from Providence Ponds. The Red Correa and the Heather can scarcely escape notice in the season; and in later spring the Crimson Bottlebrush, *Callistemon lanceolatus*, which is largely, but not all, in the flats. Such plants as *Astrotricha ledifolia*, *Grevillea floribunda*, are less easily recognized from the train. Besides these, *Brachyloma daphnoides* and *Acacia Mitchellii* are here, though not given as east in the "Key," *Dampiera stricta* occurs. Here also is *Isopogon anemonifolius*, for which, I believe, this is the only recorded Victorian locality. *Drosera auriculata* occurs, contrasting with the *D. peltata* of the plains, which are wetter in spring. *Drosera spathulata* occurs at a drain, and Coral Fern has established itself at an ooze in a railway cutting.

A little west of Providence Ponds there is a patch of the Fairy Waxflower, *Eriostemon obovalis*, and about here also the Mealy Stringybark, *E. cinerea*, var. *multiflora*, is more common, and of the very blue form seen from Moe eastward. This is the tree which was formerly thought to be *E. pulverulenta*. Though this tree, as well as But-But, have separately been called *E. Stuartiana*, they were not regarded as the same tree. This is clear in Howitt's work, where "*Stuartiana*" is But-But; his later opinion that But-But is likely to be Baker's *E. Bridgesiana* is to be found in his appendix to Herman's report of the geology of Walhalla.

A noteworthy strip of country lies to the south-east of Lake Victoria. Some of its plants are those of the parts just mentioned. I have been able to visit it at Sperm Whale Head, opposite Paynesville, and behind Seacombe. At both these places, seventeen miles apart, there occurs *Thryptomene Miqueliana*, only known here in Victoria: it may occur outside and between these limits. At Sperm Whale Head it forms the principal undergrowth over considerable areas, sometimes with abundant *Calythrix tetragona*. In this district also *Astroloma pinifolium* is abundant, and *Caleya minor* was seen. Behind Seacombe, on the sandy hills, was *Acacia suaveolens*.

The low country bordering Lake Victoria, near Goon Nure, would also probably prove interesting, but I have only visited it in autumn. Some Grass-trees, presumably *Xanthorrhœa australis*, occur. *Banksia marginata* in the tree form is seen to like lower ground than *Banksia serrata*.

Raymond Island, opposite Paynesville, is another low area. While much of it is poor Manna Gum country, some of the flats carry Swamp Mahogany, *E. botryoides*, as well as Red Gum. It is worth notice that at Orbost the *botryoides* is not restricted to the flats.

Eastward from the Tambo River, on the road to Lakes' Entrance, the Narrow-leaved Geebung, *Persoonia linearis*, may be seen, and *Acacia discolor*, the Sunshine Wattle, flowering in early winter, becomes more common. The Dusky Coral Pea, *Kennedya rubicunda*, occurs in a valley.

On the shady cliffs about Kalimna we find *Olearia viscosa*, also the Blanket-tree, *Bedfordia salicina*, Musk, and others, as well as many of the characteristic valley plants of the district. Among the climbers we may mention *Celastrus australis*, with the conspicuous orange-yellow aril of the seeds showing in the open capsule about April; *Marsdenia rostrata*, the Stalked Doubah, with flowers of the peculiar asclepiad type and long fruit with hairy seeds; *Smilax australis*, sometimes sending out shoots in luxuriant growth leafless for some feet in length; and two other liliaceous climbers, *Geitonoplesium cymosum*, with deep purple berries, and *Eustrephus latifolius*, with yellow. Lillipillies, *Eugenia Smithii*, occur in a valley, and *Pittosporum undulatum* may be seen on the cliff.

These meet at the foot of the cliffs with marsh or coastal plants. The Boobialla, which is common, is, however, a valley as well as a coastal plant in this district.

I have not collected *Acronychia lævis*, but Mr. D. Paton tells me that it is at Kalimna.

Near Nungurner there is the eucalypt sometimes called *E. Maidenii*, sometimes *E. St. Johnii*. Howitt gives a locality near Kalimna for his "*E. amygdalina*, variety *c*," which Baker makes *E. radiata*. Elegant examples may be seen also near the road bridge over Boggy Creek, at Nowa Nowa.

Chiloglottis trapeziforme occurs near the foot of a cliff near Paynesville.

THE COASTAL HUMMOCKS.—Many of the common coastal species occur. We may note also *Scævola suaveolens*, the Scented Fan-flower, with fine purple berries in autumn; *Senecio spathulatus*, Spoon Senecio, often as isolated plants or near the outer edge of the vegetation: and *Stackhousia spathulata*. The broad-leaved form of the Mistletoe, *Loranthus celastroides*, occurs on *Banksia integrifolia* and on Sea Box, Gynopogon (Alyxia). This is the original *celastroides*, the common variety being the *eucalyptifolius* form included in this species.

The berries on several of the plants are a feature of the coastal scrub in autumn; they indicate birds as seed distributors. On the other hand, *Cakile maritima*, growing at the line of rubbish on the inner shore, suggests water-carried seeds. The fruits will float. Among other plants, *Tetragonia expansa*, New Zealand Spinach, occurs on the inner side of the Hummocks and at many suitable places about the Lakes.

WET SITUATIONS—SALT MARSHES.—The wet situations vary

in depth, duration, and quality of the water. Beginning with the salt marshes, the Swamp Paper-bark appears, from the Baron's statements, to be able to stand water about half as salt as sea water, but it is not clear for how long. Near Lakes Entrance it has died off considerably; this is commonly attributed to the permanent open entrance, which would, no doubt, increase the saltness and maintain it. Suæda, Salicornia, *Juncus maritimus*, *Samolus repens*, and others occur at the west end of the Lakes' Entrance township. I have even seen *Mimulus repens* in flower temporarily under tidal waters; possibly some ground had slipped to a lower position. On Jones's Bay, at East Bairnsdale, Salicornia occupies the lowest ground; slightly higher, but still very low, the Rounded Pigface, *Mesembrianthemum australe*, grows in such quantity that acres of a blaze of pink are seen from miles away in the flowering season. *Selliera radicans*, a small Triglochin, *Cotula coronopifolia*, and *C. reptans* occur. There is a very small Cotula flowering on a single stem, with few leaves, but it may be merely precocious flowering of seedling *coronopifolia*.

A small Plantago and the grass *Distichlis spicata* also occur in salty ground.

In a salt marsh near Waddy Point, Lake Victoria, *Sebæa albidiflora* occurs; it is not given as east in the Key, and the place has had communications with Footscray, but it is probably native. I do not know whether it occurs at Footscray.

A different type of wet place is found in M'Leod's Morass, just south of Bairnsdale township. Having only a small connection to the river, and only to the open lake through five miles of river, and receiving the drainage of some twenty-five square miles of country, it is not so salt as Jones's Bay, and is also liable to long-continued flooding. It has, however, considerable soluble salts, in part magnesian, which come out as an efflorescence on the soil in dry weather. Some of the springs at its edge are salty with common salt. The lower parts carry a dense growth of tall rushes, apparently *Juncus pallidus*, reaching, on the edge of the made channel, to eleven feet in height often six. In these are roosting-places of innumerable Starlings. The mineral basis of the soil being sticky in the lower parts, it is quite possible that grazing when wet may have caused serious deterioration. Mesembrianthemum and Salicornia are absent, though many salt marsh plants occur. *Hydrocotyle vulgaris* and two other species of this genus—probably *H. pterocarpa* and *H. tripartita*—occur. *Calystegia sepium*, the larger Bindweed, grows over the rushes. Melaleuca occurs at the far edge, but not in the rush beds. Spurry, *Spergula arvensis*, is abundant, a plant of good repute for

PLATE IX.

CLEMATIS GLYCINOIDES, De C.,
Growing over a dead tree at Lake Bunga.

Photo. BULMER, Bairnsdale.

sheep, but regarded as an indicator of bad soil condition in cultivation; it is not native.

At the sulphur springs in the Clifton Morass *Phragmites communis*, *Scirpus lacustris*, and others were found with freshly-deposited sulphur about them. On the Nicholson flats there are at places acid waters from decomposing marcasite. The drains are at places bare, but the Bulrush, *Typha angustifolia*, is one of the first plants to appear as the drains are followed down. The flats are, of course, good soil apart from these acid waters at spots.

South-west of Bairnsdale, and in parts of the sandy country, as near Fernbank, there are numerous swampy areas, carrying mainly Lepidosperma, sp.; Philydrum, already mentioned, grows in these.

THE LIMESTONE CLIFFS.—Opposite Bairnsdale a limestone cliff faces south on the Backwater. It carries a dense growth of Rapanea (Myrsine), Boobialla, Bursaria, Pomaderris, Hymenanthera, &c., in which the difficulty of penetration is increased by occasional Boxthorn and Hawthorn. Creepers are also abundant—*Clematis glycinoides*, *Marsdenia rostrata*, Eustrephus, and Geitonplesium—and at the water's edge an occasional garden Honeysuckle. The nettles are tall, and hang among the bushes near face level. *Pimelea axiflora* is plentiful. On the nearly opposite, bare, sunny cliff at Pound Swamp, *Pimelea glauca*, a common Keilor Plains species, occurs, but no *axiflora*—now, at least. *Marsdenia flavescens*, the Yellow Doubah, occurs here, but I am not sure of its requirements as to habitat. A few plants of Celastrus survive. *Plectranthus parviflorus* and *Enchylæna tomentosa* also occur.

A little higher up-stream a cliff on the north side, with a south-westerly aspect, carries an abundance of *Correa alba*, the White Correa. I have not noticed this coastal plant on the Hummocks at this coast, but a limestone cliff is a dry situation. Boobialla and Coast Honeysuckle occur here, and the three are found also further up-stream. *Scævola microcarpa* grows on this cliff and on one at the Nicholson, also limestone. *Cynoglossum australe* occurs on the lower slopes freely. (The Scævola is just below the chief crags, but the soil is no doubt calcareous.)

THE MAIN VALLEYS.—The flats are mostly cleared, and largely used for maize and for grazing, but remnants of the valley vegetation may be seen. The first Kanookas, *Tristania laurina*, occur on the Mitchell near the pumping station, at the west end of the township; further up they are more common. *Callistemon paludosus* occurs, and pink and cream flowers may be seen on the same plant. Examination showed on one such that the flowers opened pink and faded. Prospect

Creek comes in from the north a few miles up; it is commonly called "Boggy Creek," and care must be taken to distinguish Boggy Creek at Nowa Nowa. A mile up this creek the valley carries Kanookas, *Lomatia longifolia*, *Bæckea virgata*, a green-flowered *Correa speciosa*, and *Prostanthera rotundifolia*, Round-leaved Mint-bush. *Cyclophorus* (*Polypodium*) *serpens* and *Hymenophyllum tunbridgense* are abundant, and other ferns occur under the shade of a cliff and trees.

Higher up this valley is of more ordinary character, but *Howittia trilocularis*, Shrub Mallow, *Callistemon lanceolatus*, Crimson Bottlebrush, *Acacia verniciflua*, Varnish Wattle, and *Lasiopetalum dasyphyllum*, with its curious flowers and handsome foliage, may be found.

At Glenaladale the Mitchell issues from its gorge and into the same flat come Iguana Creek and Stony or Moitun Creek. On the Mitchell above Glenaladale, Currajongs, *Brachychiton populneus*, may be seen. In the lowest gorge of Iguana Creek a clear stream runs over the Devonian sandstones. The lowest ground carries Lillipillies, *Eugenia Smithii*, Kanooka, *Tristania*, *Pittosporum undulatum*, Elæocarpus, &c. The Pittosporums are also seen perched on the cliffs.

On the other side of Bairnsdale we have, at Sarsfield, the Nicholson issuing from the hills through a steep-sided valley in bedrock. A path leads along the west bank from above the last house near the old ford used by M'Millan in 1840. We may notice *Leptospermum attenuatum*, Slender Tea-tree, as a very graceful element in the valley vegetation. *L. flavescens* is at the water's edge. *Phebalium squamulosum*, Scaly Phebalium, is abundant. A few plants of *Eriostemon trachyphyllus* occur; *Pomaderris betulina* occurs. *Micrantheum hexandrum*, *Phyllanthus Gunnii*, and *Beyeria lasiocarpa*, of the Euphorbia family. The Wonga Vine, *Tecoma australis*, is added to the other climbers. There are no Pittosporums; the local resident using this name refers to Rapanea. Kanookas occur abundantly, and others already mentioned. A little higher up the valley Calythrix is abundant among rocks, and *Pomaderris phylicifolia* also appears.

On the river at Bairnsdale we are not above tidal influences, and the water is salty, especially when the river is low. Silver and Black Wattles and Blackwoods, *Callistemon paludosus* and *Leptospermum lanigerum*, and rarely *flavescens*, occur. The Callistemon I have not noticed below the wharf, but the Woolly Tea-tree extends a long way down. The riverside gums at Bairnsdale are Red Gum, *E. tereticornis*, Gippsland Box, *E. Bosistoana*, Manna Gum, and Swamp Gum, *E. ovata*. Of these the Red Gum extends to the mouth of the river; some trees carry shorter and stouter buds—possibly a salt effect.

The Common Reed, Phragmites, is worth a note as a most valuable plant for breaking the wash from the river steamers and protecting the banks both by its roots and its mass of stems. It needs to be tied down to establish it. An earlier protection is made by wire-netting with Boxthorn thrown in behind it. Soundings in the Backwater gave seven feet of water just outside the Reeds.

"The Backwater" (Bairnsdale), which is open to the river below and receives the waters of Clifton Creek, carries in the water *Cladium articulatum* and *C. jamaicense* (Mariscus), Club-rushes, *Scirpus lacustris*, and occasionally *maritimus*, the Bulrush, *Typha angustifolia*, and Phragmites. In Clifton Creek the boat's progress is eventually arrested by Triglochin, Vallisneria, and other plants.

The Pound Swamp, a permanent billabong disconnected from the river in ordinary flow, situated a short distance up the Mitchell flats on the town side, presents a banded appearance in the water vegetation, the species being mixed, but different ones predominating in successive zones. Care is necessary, as the water near the cliff deepens somewhat rapidly, and the bottom is irregular from limestone blocks. At the edge *Scirpus lacustris* occurs, with patches of *Alisma plantago*. Further out are *Triglochin procera* and *Jussieua repens*, with partly floating habit. *Heleocharis sphacelata* is in patches. *Myriophyllum elatinoides*, in part mixed with the Jussieua and Triglochin, predominates after these cease; Vallisneria, also occurring in shallower waters, is seen outside this Coarse Water-Milfoil. Beyond I thought to be clear water, but in the spring of 1922 abundant flowers of a Potamogeton appeared. Obtaining some by spearing with a rod, hook, and line, I determined it as *P. ochreatus* (*P. obtusifolius*). A piece reached a length of 9 feet 3 inches, but the depth of water was not ascertained. In April, 1923, the water being very low, on a still day I was able to see clearly this Potamogeton still well submerged. (Since this was written I have obtained Ceratophyllum here, probably growing near *P. ochreatus*.)

The orchid *Dendrobium striolatum* was found freely at one place on rocks on and below a steep, shady cliff. The epiphytic orchid, *Sarcochilus parviflorus*, was also noticed on trees, in one valley only, in good shade.

Jussieua is sometimes found at the water's edge out of water, and is creeping as well as floating. It sometimes, at least, shows white outgrowths, best regarded as related to aeration. It is possibly significant that the best examples I found were in a somewhat polluted water, but a seasonal effect may be involved: they were found in late summer.

I have referred little to the hills of older rocks to the north,

which I have not so much examined. The country north of the Tertiary area is still forest, with undergrowth, and *E. eugenioides* and other species continue. *E. macrorrhyncha*, Red Stringybark, appears on all the older formations—Ordovician bedrock, granitic rocks, and Devonian. Howitt's "*E. amygdalina*, var. *a*," common form, appears; it also is rare—if it occurs at all—on the Tertiaries.

A patch of Yellow Stringybark, *E. Muelleriana*, occurs on and about Mount Lookout on Devonian and porphyritic rocks. Another patch occurs in bedrock country near Water-holes on the Nicholson, but whether actually on bedrock or alluvial I did not ascertain. Near Orbost the Yellow Stringybark occurs on what appears to be ordinary Tertiary country. Messmate, *E. obliqua*, is not common near Bairnsdale; a patch occurs just north of Bulumwaal with *E. cinerea*, var. *multiflora*. The Red Ironbark, *E. sideroxylon*, occurs on the Tertiaries as well as the older formations, though sometimes they begin at the change of the formation, and the same applies to Golden Wattle. Ironbarks reach to close to the sea cliff east of Lakes' Entrance. There is no *E. leucoxylon* in the limited sense; if the name "White Ironbark" should be heard applied to an East Gippsland tree it will probably mean *E. Sieberiana*. Hickory Wattle, *Acacia penninervis*, occurs mostly on bedrock country, but there is a patch on Tertiaries near the Moormurng Timber Reserve. *Hakea eriantha* belongs to the older formations, and a very prickly Leucopogon occurs on bedrock country. On Granite Rock, about seven miles N.N.E. of Bairnsdale, I found *Isotoma axillaris*, a fine, showy species, worth cultivation, but intensely acrid. *Rubus rosifolius* occurs on Mount Lookout, agreeing closely with Howitt's west limit for it on Mount Taylor. It very likely will occur in the lower country as well. In fact, there is ample evidence generally to show that care is necessary in stating the preferences of any of the rarer plants.

The map shows the positions of the various places referred to, but does not claim to show the creeks and crooked roads exactly. Obvious abbreviations indicate localities for various eucalypts, not necessarily the prevalent species. The dotted line indicates roughly the position where the older rock-formations are met with. The phrase "*eugenioides* country" needs interpreting as above; there is plenty of *eugenioides* further north.

LOCAL HANDBOOKS.—We are pleased to learn that the Tasmanian Government has recently published two handbooks dealing with the shells of that State, and hope to have an opportunity of giving an extended notice of them in these pages at an early date.

CITY BIRDS.

In a busy suburb, almost within stone's-throw of the tram line, and in the moderate quarter-acre enclosure for residence and garden, one would not expect to find much variety of bird-life; yet throughout the year, if species are not very numerous, the number of individual birds is remarkably so. Trees and gardens attract birds, but those cosmopolitan birds, such as the Sparrow, the Starling, and the Indian Mynah, have so thoroughly adapted themselves to urban conditions as to live and thrive in the most populous districts -more at home among chimneys and housetops than among trees. From time to time an outcry is raised against each or all of these introduced birds, which in cities and towns serve a useful purpose, not only as effective scavengers, but also in giving life and cheerfulness to drab surroundings.

In our garden the sober-feathered but perky Sparrow is a constant visitant, flitting with cheery note and observant eye from fence to lawn, from roof to tree. The Starling, that bird of uncanny sagacity, is ever with us. From his extensive vocal repertoire of varied notes, calls, and cries, among which are "Pretty Joey" and "Where are you working?" he may be heard from sunrise until after sunset in pert converse with his neighbours. For three seasons a pair of Starlings have built a nest just opposite our window, in the wall of a house from which a brick has been dislodged, whilst a couple of years ago quite a family of Starlings built their nests above the ceiling of the kitchen, making their entry under the corrugated iron. So great was the nest material they brought in, and the noise of their coming and going so constant, that ingress had to be stopped. Starlings are fond of the figs when nearly ripe, leaving little beside the skin and stalk, returning again when frightened away, if a Starling can be frightened.

The Indian Mynah is not so numerous, and contents itself with picking up crumbs and scraps from the lawn. The Blackbirds, usually in pairs, are frequent visitors. Last season, from some carefully-hidden nest, a mother bird appeared with two young ones just learning to fly, and for a fortnight found shelter in a musk tree in the garden. They are welcome birds, graceful and intelligent, less bold than the others mentioned. The Java Pigeon, always looking in prime condition for the table, appears from time to time in search of crumbs and unconsidered morsels. It is fairly numerous, and its somewhat monotonous note is frequently heard.

These are all city birds in habit and environment, but from time to time we get real country visitors. The Welcome Swallow once in a while perches on the telephone wire just under

the eaves, or flashes past on swift wing. For three years a pair have nested undisturbed under a verandah which I daily pass, and their judgment as to a site is shown from the fact that the nest is just above a butcher's window. Then a Scarlet-breasted Robin, a rare and ever-welcome visitor, will suddenly, with characteristic flight, perch on the fence or inspect the lawn and be off again. Once a Malurus or Bluecap, with attendant wives, favoured us with a passing call. When figs are ripe, in addition to the Starling, the little sharp-beaked White-eyes will ingeniously eat out the fleshy part, leaving the outer skin apparently intact. Now in spring, at night, we can hear the mournful refrain of the Pallid Cuckoo, whilst the Bronze-Cuckoo may be seen for a moment or two on the telephone wires. Wattle-birds occasionally call harshly from trees in the vicinity. Scarcely a season passes without a visit from the Harmonious Shrike-Thrush, with its rich flood of melody. This bright-eyed songster is as trustful as it is intelligent, and will stay about for a day or two before departing. Very occasionally we hear or see the rollicking Kookaburra from some perch in the vicinity, and Black Swans have been heard at night flying overhead. A pair of Magpies —a bird seldom building a nest amid houses -have for about three years nested in a pine tree not far distant, their return being announced by a matutinal burst of song. Close at hand also a pair of Grallinas for several seasons have returned and built their mud nest, their challenging cries ringing out from time to time.

An introduced songster, the little Goldfinch, now fully acclimatized around the foreshore of the Bay, sometimes visits the garden. Until lately one could rely on hearing, if not seeing, the English Skylark in full-throated song whenever there was an open space of fair size, but building operations are making its presence rare. Escaped Canaries also fly in at odd times. Last year on successive days we captured two, one of which we still have. One afternoon the rarest bird of all arrived in heavy flight upon the lawn in the form of a domestic Goose—a fine specimen. With hopeful visions of an approaching Christmas dinner, I essayed to catch the wanderer, but at the attempt it again rose in flight over the housetops in the direction of Brighton.

Crumbs and broken food are left on the grass for the birds, and in summer a vessel of water is available. Birds soon become confident and fearless when encouraged, their habits and presence affording much pleasure to those genuinely interested. —Charles Daley, Caulfield.

PLATE X.

THE STICKTIGHT FLEA (*Echidnophaga gallinacea*). × 50.
Photo.-Micro. J. SEARLE.

THE STICKTIGHT FLEA, *ECHIDNOPHAGA GALLINACEA*.

This flea, first recorded from India, has spread rapidly through the equatorial belt and overrun the United States. It would be difficult to find a chicken on any farm in the southern and south-western portions of the United States that is not infested with this pest. Unlike other species of fleas, it seldom hops about, but, having selected a suitable host, it inserts its mouth-parts deeply therein, and remains in this position for days or weeks. They attach themselves in dense masses to the comb, gills, and around the eyes of fowls, and it has been found in abundance on dogs, cats, tame rabbits, ducks, and turkeys, as well as on native birds. This pest has recently found its way into Western Australia, and is spreading rapidly through that State; and, as it is not confined to poultry alone, but can live on other birds and small mammals, it is only a matter of time when it will reach Victoria. Young chickens, when badly infected with sticktight fleas, have succumbed to the heavy drain on their vitality, and older poultry get out of condition and the egg supply is diminished; they become droopy, lose appetite, and fall off in weight. The fleas are present on hosts throughout the year, but appear to thrive best in ill-kept fowl-houses. The eggs are dropped by the female fleas while attached to the host. These fall beneath the roost, hatch, and the young larvæ feed on the excrement of the parent fleas and on other animal and vegetable refuse. The fleas are small and dark brown in colour. The body is short, thick-set, and the legs slender, but the mouth parts are large and strong. The male is usually smaller than the female, and almost black in colour.—J. Searle.

BOOK NOTICE.

A Census of the Plants of Victoria. Published by the Field Naturalists' Club of Victoria. Pp. 105 (4 x 6), crown octavo, with two maps. 3/6.

This little handbook, which has been in preparation for some years, has at last been completed, and is now on sale at 3s. 6d. per copy. It is the result of a tremendous amount of consideration and research, and, as far as the list of plants is concerned, may be taken as correct at the time of publication. It is, perhaps, not what plant-lovers have been looking for, as one cannot find at a glance what the name of any plant is from an inspection of a specimen. It is not a botany; it is mainly a list of the plants of Victoria, with the vernacular names selected for each one by the Plant Names Committee of the Field Naturalists' Club. The task of the committee has

probably been unique, for we doubt whether the selection of vernacular names for the flora of a country boasting over 2,000 species has ever before been attempted. A short preface briefly alludes to the difficulties of the task and the method of compilation. This is followed by three pages of explanatory notes, in which will be found the reasons for certain changes of names, alterations in systematic arrangement, and other details. The largest number of changes will be found in the class Filicales (Ferns), where, owing to the latest determinations, some familiar genera have disappeared; however, as all names previously in use are indexed as synonyms, little inconvenience should be caused. In the Rutaceæ and Epacridaceæ several important changes will also be found. A tabular statement of the number of genera and species under the arrangement adopted in the volume, giving totals of 582 and 2,053 respectively, shows that the leading groups are Gramineæ, Liliaceæ, Orchidaceæ, Leguminosæ, Myrtaceæ, and Compositæ.

As the work is intended to be used in conjunction with Mueller's "Key," his systematic arrangement is also given. The census occupies sixty-nine pages, and gives the name of every species, with its page in Mueller's "Key" or other work where described, the vernacular name adopted, its regional distribution in Victoria, and (in the case of plants occurring within thirty miles of Melbourne) a further reference to the class of country in which they are found. A list is given of plants erroneously recorded for Victoria, of which no authentic Victorian specimens can be traced. A list of the naturalized alien plants occupies ten pages. Finally, separate indices are provided for families (the term "order" being superseded by the latest authorities), genera, and vernacular names. Two maps are included, one of Victoria showing Mueller's geographical districts, and the other of the Melbourne district, covering a radius of thirty miles from the G.P.O. This map bears indications showing the geological nature of the country, thus acting as a guide to the habitats of the plants. The work is a valuable addition to the botanical knowledge of the State, and we trust the vernacular names given will be adopted by all plant-lovers and students, so that in course of a few years unanimity on this point will be established. The volume fills a decided want, and it is hoped may lead to the publishing of an illustrated botany of Victoria. At present beginners in any branch of natural history (except birds) are discouraged by the absence of local works of reference, the great expense of publication and the comparatively limited demand for such works being no doubt responsible for their absence from our bookshelves. The printing, which was done by Walker, May and Co., is clear and well carried out.

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Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 12th NOVEMBER, 1923.

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBER—	PROPOSER.	SECONDER.
Miss Beatrice Bolton, 10 Shenley-street, Canterbury.	Miss F. Smith.	Mr. G. Coghill.
Mr. F. A. Hughes, Poath-road, Oakleigh.	Mr. H. B. Williamson, F.L.S.	Mr. C. Daley, F.L.S.
AS COUNTRY MEMBER—		
Rev. A. C. F. Gates, M.A., The Vicarage, Lara.	Mr. E. E. Pescott, F.L.S.	Mr. P. F. Morris.

3. Nominations for Membership.

4. General Business.

5. Remarks by Exhibitors relative to their Specimens.

Ten minutes' adjournment for discussion of Exhibits.

6. Reading of Papers and Discussion thereon.

1. By Messrs. A. N. Burns and L. Thorn—"Four Weeks Collecting (Entmology) in Northern New South Wales and Southern Queensland."

2. By Mr. J. C. Goudie—"Notes on the Coleoptera of North-Western Victoria." Part X.

7. Reading of Natural History Notes.

Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and *Naturalist*. Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Club year ended on 30th April last. Any subscriptions overdue should be forwarded to the Hon. Treasurer *at once*.

Subscriptions for 1923–4 are now due, and should be paid to the Hon. Treasurer as early as possible.

The Hon. Treasurer requests that members who received tickets for sale for Wild flower Exhibition will settle for them as early as possible, so that the accounts may be closed.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 8th October, 1923.

The president, Mr. C. Daley, B.A., F.L.S., occupied the chair, and about fifty members and friends were present.

REPORTS.

A report of the excursion to Frankston on Saturday, 15th September, was forwarded by the leader, Mr. J. W. Audas, F.L.S., who reported that, owing to unfavourable weather, the excursion was poorly attended. A direction was taken through the Park Reserve, where a number of familiar shrubs were seen in full bloom. The Jungle Sunflower, *Osteospermum monoliferum* (indigenous to South Africa), a rather handsome shrub with large yellow flowers, was noticed to be spreading in the district. Returning to the township by a different route, the local flower show was visited, where Mr. A. E. Keep and himself were invited to judge the wild-flower exhibits, which they did, and were pleased to see the display made by the local flowers, of which at least one hundred species were represented. Later a visit was paid to the State Forest Pine Reserve, about two miles north-east of Frankston. Here the Remarkable or Monterey Pine is doing well, many of the trees being upwards of thirty feet in height. Some fine bushes, fully ten feet in height, of the Silky Hakea, *H. acicularis*, were noted here, covered with their white blossoms. The Austral Indigo, Golden Goodia, and the Leper and Sweet Acacias were all seen in full bloom. On the way to the Seaford railway station a number of orchids were noted, of which the Nodding Greenhood, *Pterostylis nutans*, Maroon Hood, *P. pedunculata*, and the Snake Orchid, *Diuris pedunculata*, were the most interesting.

A report of the excursion to Cheltenham on Saturday, 22nd September, was, in the absence of the leader, Mrs. E. Coleman, given by Mr. C. Daley, F.L.S., who said that an enjoyable outing resulted, but no unusual species had been noted. About a dozen kinds of orchids had been seen, of which *Lyperanthus nigricans* was the most interesting.

A report of the excursion to Bendigo on Saturday, 6th October, was given by the leaders, Messrs. Daley and Paton, who said that the party had been favoured with fine weather. They had spent the first afternoon at Epsom, and the Sunday at Mandurang, to the south-east of the city, where flowers of many kinds were in great abundance.

A report of the excursion to Keysborough on Saturday, 13th October, was given by the leader, Mr. H. B. Williamson, F.L.S., who said that, on leaving the train at Noble Park station, the road towards Keysborough was taken, but time did not permit of going the whole distance. Working through some scrub, a number of interesting flowers were met with. The Wedding-bush, *Ricinocarpus pinifolius*, three species of Guinea-flower (Hibbertia), and the Common Flat Pea, *Platylobium obtusangulum*, were at their best. Nine species of orchids were noted, including the Red-beak Orchid, *Lyperanthus nigricans*. Among the plants gathered on some low-lying land recently submerged were the Water Blinks, *Montia fontana*, and the Pink Bladderwort, *Polypompholyx tenella*, the latter interesting on account of the insect-trapping vesicles on its roots. It was noted that *Watsonia meriana*, Bugle Lily, a South African importation, is rapidly becoming a pest in the district. A very fine Red Gum, *Eucalyptus rostrata*, growing in the railway reserve, was much admired, and hopes were expressed that "Old Noble" would long remain to witness the passing trains and the growth of the new suburb.

EXHIBITION OF WILD-FLOWERS.

The chairman gave a brief report on the exhibition of wild-flowers held at the Town Hall on 3rd inst. He said the exhibition had not been quite so largely attended as in some previous years; still, it was anticipated that when the accounts were closed there would be a fair sum to divide with the Victorian Bush Nursing Association. The rough weather of the week-end had probably militated somewhat against the display, but this was hardly noticeable except to expert eyes. He claimed that the exhibition would rank as one of the most successful yet held.

Mr. F. Pitcher added his congratulations on the success of the exhibition, and moved—"That the best thanks of the Club be accorded to all donors and exhibitors of flowers; to all members and their friends who so willingly and ably assisted the ladies' special committee and the general committee with their services on the day of the exhibition; to Messrs. Keep Bros., for their great kindness in lending their motor, with driver, for the whole day for the purpose of collecting consignments of flowers at the several railway stations; to the Victorian Railways for facilitating the despatch and delivery of consignments; to the Tourist Bureau officials; to the National Museum, for the loan of jars; to the *Argus*, for press notices; to the *Age*, for paper for covering tables; and to the Victorian Bush Nursing Association, for obtaining flowers from distant localities for the exhibition."

This was seconded by Mr. F. G. A. Barnard and carried unanimously.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. Thos. Kerr, Box 2,515, Spencer-street P.O., Melbourne; Mr. J. R. Leslie, 4 Lara-street, South Yarra; Rev. E. Nye and Mr. Edward E. Nye, 169 Punt-road, Prahran, were duly elected members of the Club.

GENERAL BUSINESS.

The chairman announced that the long-promised "Census of Victorian Plants, with Their Vernacular Names," was now available to members.

Mr. G. Coghill considered that the members of the Plant Names Committee, who had given so much time to the consideration and compilation of the "Census," deserved the congratulations of the Club on the completion of their task. He moved that specially bound copies of the "Census" be presented to each member of the committee as mementos, specially referring to Dr. C. S. Sutton, Mr. H. B. Williamson, and Mr. P. R. H. St. John as having taken a prominent part in the work.

This was seconded by Mr. J. L. Robertson, M.A., and carried by acclamation.

REMARKS ON EXHIBITS.

Mr. F. G. A. Barnard called attention to his exhibit of a pot-grown specimen of the Meadow Moonwort, *Botrychium* (*lernatum*) *australe*, R. Br. This plant he had collected in the Oakleigh district some thirty years previously, and it had been exhibited on several occasions at the Club meetings. It was a deciduous plant, sending up its new fronds in February of each year. This season the first fronds sent up had been eaten off by slugs or wood-lice, but by isolating the pot in a pan of water he had managed to save two subsequent fronds when they made their appearance. This year it had produced both fertile and infertile fronds; often only the latter appear, but never has it produced more than two fronds at one time in a season.

PAPER READ.

By Mr. D. Paton, entitled "The Plants of the Whipstick, Bendigo."

In the absence of the author the paper was read by Mr. C. Daley, B.A. The author, in a comprehensive paper, described the characteristics of the Whipstick flora, illustrating his remarks by dried specimens and a map of the area dealt with. This extends to the north-west of Bendigo, from near Eaglehawk to Kamarooka, covering about sixty square miles.

The paper was discussed by Messrs. Williamson, Daley, Oke, and Dr. Sutton.

EXHIBITS.

By Mr. J. W. Audas, F.L.S.—Specimens of *Anguillaria* (*Wurmbea*) *dioica*, R. Br., Early Nancy, showing great variation in colour, while some of the flowers measured three-quarters of an inch across; collected at Beechworth, September, 1923.

By Mr. F. G. A. Barnard.—Growing plant of *Botrychium australe*, with sterile and fruiting fronds.

By Mr. C. Daley, F.L.S.—Photographs of Canberra and surrounding district.

By Mr. J. E. Dixon.—Cabinet drawer containing 112 species of Hemiptera—ground and tree bugs—mostly Victorian.

By Mr. C. Oke.—Gizzard (proventriculus) of a weevil, under the microscope.

By Mr. D. Paton.—Plants from the Whipstick; also map (in illustration of paper) of area dealt with.

By Mr. E. E. Pescott, F.L.S.—Growing plant, in flower, of a South African orchid, *Satyrium corrifolium*, Sus., found as a garden escape in South Australia; *Pterostylis furcata*, Lindl., a rare species; *Thelymitra epipactoides*, F. v. M., albino form, first record of this form; *Caladenia cordiformis*, Rogers, which was formerly known as *C. Cairnsiana*, F. v. M.

By Mr. F. Pitcher.—Seedling plants of the Erect Clematis, *Clematis glycinoides*, illustrated in September *Naturalist*, and growing in hundreds in his garden at South Yarra.

After the usual conversazione the meeting terminated.

EXCURSION TO HEIDELBERG.

Probably owing to threatening weather, the attendance at the pond-life excursion to Heidelberg on Saturday, 8th September, was rather small. Though water was abundant, and the river so high that one of the ponds usually visited could not be approached, the material collected proved to be unusually good. The diatom *Tabellaria flocculosa* was found to be extraordinarily plentiful. Other algæ of the following genera were noted, viz.:—Anabæna, Pleurotænium, Micrasterias, Closterium, Cosmarium, Staurastrum, Euastrum, Netrium, Spirogyra, Zygnema, Debarya, and Bulbochæte. Of Protozoa special mention may be made of two uncommon Euglenids—viz., *Euglena texta* and *Amblyophis viridis*. A number of Vorticellæ were green with a contained symbiotic alga. Other Protozoa noted were *Amœba proteus*, *Acanthocystis* (?) *crinaceus*, *Actinophrys sol*, *Centropyxis aculeata*, *Arcella discoides*, *Dinobryon sertularia*, *Astasia tricophora* *Phacus* (?) *triqueter*, *Pandorina*

morum, *Gonium pectorale*, Monosiga, sp., *Rhipidodendron huxleyi*, *Uvella virescens*, *Trachelomonas hispida*, *Gymnodinium fuscum*, *Paramaecium bursaria*, *Lacrymaria olor*, *Ophryoglena atra*, Opercularia, sp. Rotifers were very numerous. Besides many others, the following were noted:- *Œcistes pilula*, which builds its tube of large pellets of faecal matter: *Melicerta ringens*, *Cephalosiphon limnias*, *Floscularia ornata*, *Furcularia longiseta*, and *Ratulus longiseta*. A very interesting larva, that of a fly, *Corethra plumicornis*, was taken in the "Dairy Pond." This animal, which has been called the "Phantom Larva," by reason of its extraordinary transparency, would be almost invisible but for the dark-looking air-sacs which are situated near the head and tail of the creature. These it has the power of filling from the air dissolved in the water in which it lives. They may be considered as analogous to the swim-bladder of a fish. The somewhat obscure group, Gastrotricha, was represented by a species of Chætonotus. Altogether, the afternoon proved a very successful one, and we were well repaid for the time spent on the excursion.—J. Stickland.

EXCURSION TO CHELTENHAM.

A fair number of members and friends took part in an orchid search at Cheltenham on Saturday, 22nd September. The late rains had retarded the orchid season somewhat, so we made for a portion of burnt scrub off Balcombe-road, where it was thought we might find *Lyperanthus nigricans*, which seems to thrive better where there has been a bush fire. Ten species of orchids were found. *Glossodia major* was very numerous, though not at its best. *Diuris longifolia*, beautiful flowers of which have been found here in past seasons, was particularly stunted. Not one Pterostylis was found. *Lyperanthus nigricans* was fairly abundant, though on unburnt areas near by there were many patches of very fine leaves, but no flowers. This condition has been noted in other seasons.—Edith Coleman.

EXCURSION TO BENDIGO.

Again taking advantage of the annual railway picnic, on Saturday, 6th October, about twelve members went to Bendigo, reaching their destination at noon. Augmented by three local nature-lovers, the party proceeded to the Botanical Gardens at White Hills, where lunch was taken, after which the area about two miles east of the Epsom racecourse was visited. The season, as regards flowers, was late here as everywhere, and the ground rather dry, so the display of flowers was not so good as on a

previous visit (*Vict. Nat.*, vol. xxxviii., p. 80). Sixty-seven flowering plants and one fern, *Cheilanthes tenuifolia*, were noted. *Olearia teretifolia*, *Eriostemon obovalis*, and *Grevillea lanigera* were the most in evidence. Twelve orchids were found, among which were *Thelymitra Macmillani*, some fine Spiders, *Caladenia Patersonia* and *C. testacea*, some with scented, others with scentless flowers, the reason for the difference not being obvious. *Glossodia major* and *Diuris pedunculata* were abundant, and in bright flower.

Next day, a char-a-banc being hired, a visit was made to South Mandurang, where conditions were much improved for collecting (*Vict. Nat.*, vol. xxxix., p. 34). The country was looking its best. A fine feature was the beauty and freshness of the Fairy Wax-flower, the distinctive flower over the auriferous areas in the Bendigo and Castlemaine districts. There is a danger, owing to the popularity of this dainty flower, of its disappearance from some habitats. Already it has receded some miles from where it was formerly obtainable, the motor-car and the flower-seller being incidentally its greatest enemies. *Tetratheca ciliata* was much brighter and better than at Epsom. Camp was made beside the Malmsbury water-race, in the vicinity of which there was a fine display of flowers. Thinning out the forest reserve has made changes, but the sward, unusually green, was dotted with daisies, golden buttercups, Anguillarias, Sunrays, and many orchids, especially *Glossodia major*, in varying shades of pale blue to purple. *Diuris maculata* was also abundant. No less than twenty-one orchids were found, making twenty-five for the two days—an excellent record for Bendigo. The most interesting were the little *Diuris palustris*, with grassy leaves, probably a new find in this district, some specially fine red Spiders, a few specimens of *Diuris palachila*, and *Thelymitra ixioides*. A tall Thelymitra, which may be *T. grandiflora*, was also found. Other flowers obtained were mostly as mentioned before (*Vict Nat.*, vol. xxxix., p. 34). Eighty-six species of flowering plants were seen, also two ferns—a creditable total for this area. Some of the party proceeded about two miles and a half along the water-race towards Big Hill, and, diverging, were rewarded, on the ascent of a contiguous spur, with a splendid panorama—the One-Tree Hill Ranges in the near distance, and, beyond, Mounts Camel, Ida, and Pleasant, near Heathcote, with intervening hills and plains over which the fitful sunshine came and went. Southwards, masses of cloud and some rain obscured the view, but Mount Tarrengower, to the south-west, stood out plainly, whilst southward Mount Alexander reared its massive shoulders above the smaller hills. The open, park-like aspect of the granite hills and slopes on the one side showed a marked contrast

with the more thickly and differently-timbered ranges of the auriferous measures on the other. A most enjoyable day was spent, the heavy and widespread rain avoiding the excursionists.

Mr. J. E. Dixon, who went out to Myers' Flat in search of insects, reports that beetles were very scarce. Most of the shrubs in that locality had finished flowering, with the exception of the Gold-dust Wattle, on which the Ladybird, *Paropsis perplexa*, could be taken in hundreds. Other coleoptera taken were: Buprestidæ—*Stigmodera elongata*, Macleay, *Melobasis verna*, Hope, *M. rotundicollis*, Blkb., M. sp.; Curculionidæ—*Acantholophus adelaidæ*, Waterh., *Leptops Hopei*, Fab. (Mallee variety); Cistelidæ—*Alcmeonis pulchra*, Bates, Anaxo, sp.; Elateridæ—*Eolus australis*, Cand.

The following twenty-five species of plants not previously listed on these excursions are enumerated:—

SCHEUCHZERIACEÆ—
Triglochin procera.
JUNCACEÆ
Luzula campestris.
ORCHIDACEÆ—
Thelymitra ixioides.
T. carnea.
T. longifolia.
Cyrtostylis reniformis.
Caladenia angustata.
C. dilatata.
C. Patersoni.
C. testacea.
Diuris palustris.
Pterostylis cycnocephala.
URTICACEÆ—
Parietaria debilis.
CRASSULACEÆ—
Crassula Bonariensis.
LEGUMINOSÆ
Dillwynia hispida.
Goodia lotifolia.
STACKHOUSIACEÆ—
Stackhousia linarifolia.
DILLENIACEÆ
Hibbertia linearis.
MYRTACEÆ
*b*Melaleuca ericifolia.
HALORRHAGIDACEÆ—
*o*Myriophyllum intermedium.
SCROPHULARIACEÆ—
Euphrasia collina.
GOODENIACEÆ
Goodenia elongata.
COMPOSITÆ
Leptorrhynchus elongatus.
Helichrysum scorpioides.
Helipterum incanum.

D. J. PATON.
CHAS. DALEY.

EXHIBITION OF WILD-FLOWERS.

THE annual exhibition of wild-flowers was held in the Melbourne Town Hall on Wednesday, 3rd October. Owing to the unusual lateness of the season and the inclement weather experienced for a few days before, the display was hardly equal to some of its predecessors. One collector had the unique experience of passing through a snow-storm on his way to the district he had chosen for his collecting-ground.

The attendance of the public was not quite so large as at some previous exhibitions, but this must not be taken as evidence of diminished interest in the exhibition, but rather as the effect of counter attractions. It had, however, its

advantages, as those who attended were able to obtain a better view of the various exhibits.

The exhibition was opened by the Hon. H. S. W. Lawson, Premier of Victoria. In introducing Mr. Lawson, Mr. Chas. Daley, B.A., F.L.S., president of the Club, stated that one of the main objects of the Club was to create an interest in the native fauna and flora of Victoria, and thus in that of Australia. Opportunity was taken once a year to bring prominently under the notice of the public the beauties of the wild-flowers of the State by means of an exhibition such as the present, and by its means to incidentally add to the funds of some deserving institution. This year the Victorian Bush Nursing Association had been chosen, which, he thought, was a happy idea, as from the bush in various directions were received the flowers on the tables in the hall. It might be of interest to state that since the inception of these exhibitions in 1916 (when the profits were handed over to the Y.M.C.A. for its soldiers' work) nearly £1,000 had been raised by this means for special objects of a philanthropic nature. The proceeds of the 1920 exhibition had been set aside for the publication of a handbook relating to Victorian botany, and this little volume had now been completed, and was for sale in the hall.

The Premier, Mr. Lawson, in declaring the exhibition open, said that in his opinion the Field Naturalists' Club deserved the thanks of the community for having, in this and other ways, inculcated a love of the beautiful and a spirit of research. A token of the interest taken by the public was the large attendance present that afternoon. To leave work and indulge in æsthetic tastes was of undoubted benefit, and at the same time helped to stimulate interest and scientific research—an action which must be of ultimate benefit to the individual. He congratulated the Club on the beauty of its exhibition and the practical nature of its efforts.

The first display to catch the eye on entering the hall was a fine collection of flowers from the Grampians, the result of a special visit made to that district by Mr. G. Coghill, who is also an enthusiastic grower of native flowers. Here were to be seen masses of the Native Heath, *Epacris impressa*, in various shades, from deep crimson to the purest white, Grevilleas, various pea-shaped flowers, myrtaceous flowers, and many others, the whole forming a very imposing display.

To show that Australian plants are capable of improvement and development, the acting director of the Melbourne Botanic Gardens, Mr. W. Laidlaw, B.Sc., had forwarded about forty varieties of cut flowers of distinctive Australian plants in cultivation at the Gardens. These were effectively staged and labelled in front of the platform by Mr. P. R. H. St. John,

and included:—*Acacia montana*, V., *A. leprosa*, V., *Baucra rubioides*, V., *B. sessiliflora*, V., *Boronia inornata*, *B. megastigma*, W.A., *Calytrix Sullivani*, V., *Chamælaucium concinnatum*, W.A., *Chorizema cordatum*, W.A., *C. ilicifolium*, W.A., *Doryanthes Palmeri*, Q., *Eucalyptus erythronema*, W.A., *E. sideroxylon*, var. *pallens*, N.S.W., *E. torquata*, W.A., *Grevillea acanthifolia*, N.S.W., *G. caleyi*, N.S.W., *Olearia pannosa*, V. and N.S.W., and *Pultenæa daphnoides*, V. and N.S.W.

An interesting exhibit, daintily arranged, and which attracted much attention, was a display of native orchids by Mrs. Coleman and friends. In this eleven genera and forty-two species were represented. Of Pterostylis there were twelve species, Caladenia eleven, Diuris five, Thelymitra four, Calochilus and Lyperanthus two each, and Chiloglottis, Cyrtostylis, Sarcochilus, Corysanthes, Acianthus, and Glossodia one each. Thirty-eight of the species were collected at Healesville, Blackburn, and Cheltenham. Of several of the species large numbers were shown, while separate groups were made of typical specimens of Pterostylis and Caladenia. Included in the exhibit was a Calochilus from Rushworth which may prove to be a new species.

Among the flowers exhibited on the various tables were a number which are worthy of special mention. From Annuello (N.W.) came *Olearia magniflora*, Splendid Olearia, and the two Halganias, *H. cyanea* and *H. lavandulacea*; from Bolton (N.W.) the Pink Velvet-bush, *Lasiopetalum Behrii*; from Dingee State school and Emu (N.W.), fine supplies of *Swainsona procumbens*; from Diapur (N.W.), *S. oxytropis*; from Mildura (N.W.), Nardoo, *Marsilea Drummondii*, shown in water with fronds floating, the curious Mouse-tail, *Myosurus minimus*, and the Small-leaved Swainsona, *S. microphylla*; from Underbool (N.W.), the Austral Hollyhock, *Lavatera plebeja*; from Ouyen (N.W.), *Cassia eremophila* and *C. Sturtii*, *Prostanthera aspalathoides*, Scarlet Mint-bush, and *P. chlorantha*, Green Mint-bush; from Tempy (N.W.), the Orange Immortelle, *Waitzia acuminata*; the Slender Monkey-flower, *Mimulus gracilis*, the Desert Hop-bush, *Dodonæa stenozyga*, also came from the north; from Bairnsdale (S.E.), *Hakea eriantha*, *Smilax australis*, *Leucopogon juniperinus*, *Solanum pungentium*, and *Phyllanthus Gunnii*; from Moe (S.E.), *Tecoma australis*; from Lima East (N.E.), *Swainsona plagiotropis*, Red Swainsona.

In response to the request of the Club, flowers were sent from several of the Bush Nursing Association centres.

Flowers were received from a wide range of localities, and again packages were received without indication of name of sender. The following are the localities recorded and the name of the sender, where known:—

North and North-West. Annuello, W. Chapman; Bolton, F. Holt; Emu, bush nurse; Gunbower, B.N.; Kerang, Miss English; Mildura, H. B. Williamson; Nullawill, B.N.; Ouyen, Rev. and Mrs. Pryor; St. Arnaud, Miss English; Tempy, B.N.; Underbool, E. Cruise; Wimmera—Diapur, Mrs. Hensley.

South-West.—Harrow, Nurse Cralc; Grampians, G. Coghill, C. D'Alton; Stawell, J. A. Hill.

Bendigo.—Bendigo, D. J. Paton; Dingee, Mrs. Grylls, State school; Maldon, Mrs. Brooks, J. C. Goudie; Taradale, Mrs. Hemsford; Tandarra, ————.

North-East.—Girgarre, J. Vines; Lima East, Miss Evans; Rushworth, Mrs. Rich.

South.—Black Rock, Miss Nokes; Belgrave, F. Pitcher; Camberwell, Master J. Pescott; Croydon, Nora and Eric Sedgwick; Drysdale, D. K. Whyteron; Emerald, W. Scott; Greensborough, H. Ford; Hampton, A. Lyne; Lower Leigh, State school; Mount Dandenong, Miss Nokes; Mount Dandenong North, Miss S. Kinvig; Meredith, B.N.; Pakenham, F. Wisewould; Paradise, ————; Red Hill, Mrs. Higgins; Ringwood, Mrs. Matthews; Somerville and Tyabb, L. Thorn.

Gippsland (S.E.)—Bairnsdale, T. S. Hart; Boolarra, State school; Drouin, Mrs. Dyatt; Heyfield, Mrs. Macfarlane; Lardner, Miss K. Currie; Moe, C. Lewis (?); Tyers, Miss Galbraith.

Flowers were also received from other States. The Barrier Field Naturalists' Club, Broken Hill, N.S.W., forwarded a fine lot of Sturt's Desert Pea, *Clianthus Dampierii*, which found ready sale after the exhibition, also about a dozen species characteristic of the district. Mr. E. Ising, hon. sec. Field Naturalists' Section, Adelaide, S.A., forwarded about thirty species from the Mount Lotty district; and Mrs. Brookes, Perth, W.A., forwarded Kangaroo Paws and other Western Australian flowers.

A nice collection of cultivated indigenous flowers was forwarded by Mr. J. M. Watson, of "Maranoa," Balwyn, also by the Misses Currie, Lardner, *via* Drouin, Mr. G. Coghill, Mr. A. S. Blake, Morgan Bros. (Clayton), and others.

Quantities of foliage and fruiting branches of Eugenias were forwarded by the Director of the Botanic Gardens for decoration purposes, while a number of pot specimens of native plants found ready sale, and, with the sales of bunches of flowers and of Waratahs from New South Wales, helped to swell the takings considerably. These sales were conducted by a ladies' committee under Miss A. Fuller, while Miss H. Gabriel and a number of lady friends undertook the conduct of the refreshment department.

As far as can be ascertained at present, there will be a surplus of about £100 to divide between the Club and the Bush Nursing Association.

PLATE XI.

CRADLE MOUNTAIN FROM THE SOUTH.

Photo. SPURLING, Launceston.

CRADLE MOUNTAIN (TASMANIA) AND ITS FLORA.

By C. S. SUTTON, M.B.

(*Read before the Field Naturalists' Club of Victoria, 13th Aug., 1923.*)

THERE are many beautiful places in Tasmania, some of them little known even to its own people; and not the least of these is the Cradle Mountain, which, thanks to my old friend Mr. Gustave Weindorfer, I have been able to visit on five occasions.

When the first excursion there was made with him, in 1909, there was no track for the last seven miles or so, infrequent blazed trees being the only indications as to the direction to be taken. Though still out of the beaten track—which, indeed, only adds to its charm—this delectable locality is, in reality, now so accessible that a visitor can reach "Waldheim," Mr. Weindorfer's comfortable chalet, on the evening of the day after leaving Melbourne. The way lies from Burnie, by rail, to Sheffield, and thence about forty miles by road through Wilmot, Moina, and the Middlesex Plains. Each year the road from the latter place, across the Pencil Pine Creek and through the valley of the Dove River, is being improved, until it is now quite practicable for vehicles up to the last mile or so. Actually motor cycles have been ridden, or pushed, the whole distance.

The three chief elevations in the district are the Cradle Mountain (5,069 feet), Mount Brown (4,607 feet), and the Barn Bluff (5,115 feet), the last being only a few feet lower than the summit of Ben Lomond, the highest point in Tasmania. These shattered vestiges of the vast dolerite sill which once covered the greater part of the island stand on a plateau about 1,000 feet high, composed partly of Pre-Cambrian schists and quartzites and partly of Permo-Carboniferous sandstone. The first-named, looking like the lower jaw of some prehistoric monster rather than a cradle, is the most picturesque, and consists of a narrow, serrated ridge nearly a mile long, running in a north-easterly and south-westerly direction. On the northern side it is draped with rock falls or screes, up one of which, using both hands and feet, the summit is reached with comparative ease. On the southern side, like the Barn Bluff, it is precipitous, and apparently unscalable. The Bluff looks, indeed, like a barn, and, though higher, is approached more gradually, so that the shorter final climb is less arduous. On its eastern side is a huge rock fall, looking as though a large part of the summit had come away at the one time.

From these two outlooks, on a fine day, there is "wide wandering for the greediest eye." The north coast, from Table Cape to Tamar Heads, can be made out. The workings

and buildings of the famous Mount Bischoff mine can be easily seen, and the smoke from a locomotive on the Emu Bay railway across the Pieman River is visible. All around are mountains and deep gorges. To the north and east the Black Bluff, Mount Roland, and the Western Tiers; to the south, Mount Pelion; west, Mount Ossa, the Eldon Range, Mount Reid, and a world of others.

Almost everywhere are evidences of glaciation, referred to Pleistocene times: cirques cut into the plateau, on the floors of which are deep lakes, lakelets, and tarns at different heights in every direction, ice-scored rocks, moraines, and erratics.

Of the larger lakes, the most extensive is the Dove Lake. This very beautiful piece of water, in outline resembling a boomerang, is about a mile and a quarter long, a quarter of a mile wide, and nearly two hundred feet deep. Towards its outlet the banks are low and covered with a short scrub fragrant with Boronia, but the southern shores are steep, and densely clad with forest right to the water's edge. Through this thick mantle of vegetation at the head of the lake, from a source three hundred feet above, tumbles, with ceaseless roaring, an invisible cascade, made from the surplus waters of the tiny Lake Wilkes, perched on a ledge under the Little Horn. Near by lies a cluster of little wooded islets close to the further shore, and here and there around the lake margin are charming little beaches of snow-white, finely-graded pebbles.

Of a very different character scenically is the so-called Crater Lake, set deeply into the northern face of the plateau. At a higher level, it is smaller, but deeper, and pear-shaped in outline. Everywhere the banks are steep, and rise to a height of as much as 500 feet. In certain weather conditions, with an overcast sky and with clouds swirling across its face, it has a truly awe-inspiring appearance; but in others, viewed from above, when its surface, like a dark mirror, is now and again gently stirred, first one way and now another, by faint vagrant breezes, it is a strangely beautiful sight.

Lake Rodway, on the far side of the Cradle Mountain, has more open surroundings, and, with Mount Brown in the background, has a beauty of its own. It is situated on part of the floor of the great cirque, where once, in Dr. Benson's opinion, was a glacier a thousand feet in thickness, and empties into a great gorge, to feed, like the others, the Forth River.

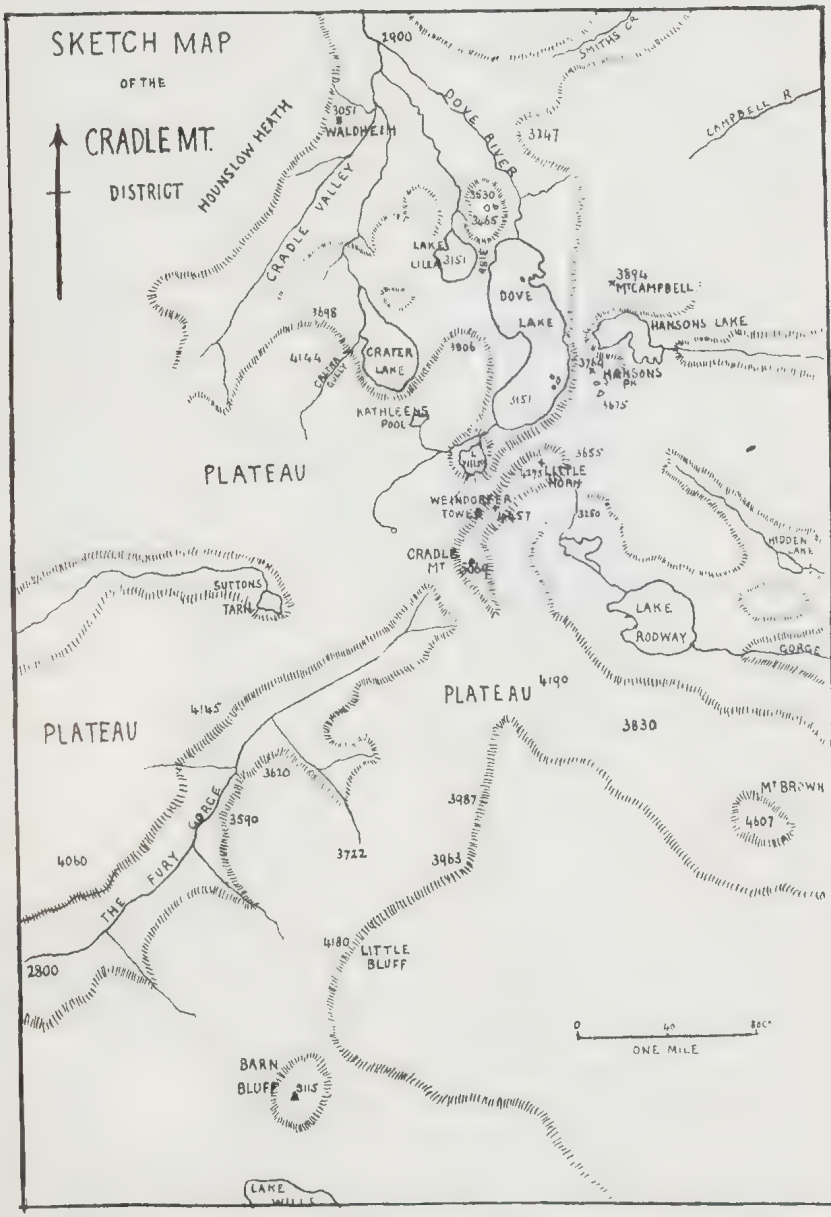
Space will not permit other than bare mention of Lake Hansen, away up between Mount Campbell and Hansen's Peak; the curious Twisted Lakes on the ridge there; the charming Lake Lilla, close to the Dove Lake; the rock pools on the *roche moutonnée* hill between the outlets of the two last mentioned; another among the moraine hummocks, where

PLATE XII.

CRADLE MOUNTAIN AND DOVE LAKE.

Photo. SPURLING, Launceston.

platypus disport; and the more distant Lake Campbell and Lake Wills.



The precipitations at "Waldheim" are considerable, averaging over 100 inches, and as much as 23 inches was recorded

in May last. January and February are the driest months, and consequently those most favourable for a visit, as the weather is then usually delightful, the temperature rarely exceeding 80°, and the nights correspondingly cool.

Regarding the vegetation—the writer's chief interest—no systematic description of the plant communities can be attempted here. Various types of forest growth, grass-land or sub-alpine meadow, dwarf sub-alpine scrub, "Button-grass," "Gleichenia-Restio," and plateau associations, each containing its own characteristic set of plants, are plainly distinguishable, and it is hoped that a sketch of these, in the nature of a *reconnaissance* survey of the locality, may perhaps appear in another place. Here only some impressions can be recorded, some comparisons with our own alpine flora drawn, and references made to the more interesting endemic species.

In the first place, the forest growth covering a great part of the steep plateau slopes sometimes contains no eucalypts at all, and sometimes, though present, they are quite subordinate. Near "Waldheim" there is a large stretch of forest composed mainly of King William Pine, Athrotaxis, whose stems are often thickly covered with the very beautiful *Hymenophyllum Malingii*, brown with closely felted hairs, and in lesser degree with *H. tunbridgense*, the Myrtle Beech, and the deciduous Beech, *Nothofagus Gunnii*. With these are, amongst others, *Atherosperma moschatum*, *Pittosporum bicolor*, *Leptospermum lanigerum*, var. *montanum*, the indigenous Waratah, *Telopea truncata*, *Richea pandanifolia*, sometimes attaining a height of thirty feet, with the growth form of Pandanus and Cordyline, and bearing creamy panicles of flowers concealed in the axils of the leaves; the curious Celery-top Pine, *Phyllocladus*, with leaves reduced to minute scales, their places being taken by flattened branchlets, and the shrubby *Archeria eriocarpa*, with an abundance of beautiful reddish flowers. Apart from this profound difference in the appearance of the forest, due mostly to the presence of the Pines, of which there are seven species on and around the mountain, and the Richeas, the strongest impressions are created by the great variety of the Epacrids, numbering about thirty; the profusion of composites, chiefly Olearias and Helichrysums, about fifteen in all of these being endemic; the abundance of liverworts, lichens, and mosses; the huge beds of Sphagnum in the valleys; and the curious "cushion" plants of the plateau. One is struck also by the paucity in species of leguminous plants. Although *Pultenæa subumbellata* occurs at the edge of Hounslow Heath, just above the valley, and *P. juniperina* and *Bossiæa cordigera* in the Dove Valley, only

Oxylobium ellipticum—just as is the case at Kosciusko—reaches above the tree line.

Amongst a total of about 250 species in all noted, about 150 are found in our Alps. In the forests we are already familiar with Drimys, *Gaultheria hispida*, *Cyathodes acerosa*, and others already mentioned, but there are also many most attractive endemic species.

In the mixed Eucalyptus and Athrotaxis forest, on the margin of which the chalet is situated, are many fine shrubby Epacrids. *Trochocarpa disticha* has pinkish flowers in short, dense terminal spikes, and fleshy purple fruits about half an inch in diameter. *T. thymifolia* has red flowers in nodding spikes and pale purple fruits of about the same size. *T. Gunnii*, white flowers, also in spikes, and rather smaller, purplish to orange fruits. *Cyathodes acerosa* is abundant, with red fruits. *Richea scoparia* bears torch-like red spikes, and *R. sprengelioides* yellow ones, both with stiff, pungent leaves like our own *R. Gunnii*. On the margin of the forest are fine large bushes of *Olearia pinifolia*, quite six feet high, with rounded pungent leaves and a wealth of snow-white blossom. Other forest species are *Lucrvphia Billardieri*, so far seen only on the far side of the Dove Lake, near the water's edge, *Cenarrhenes nitida*, *Anodopetalum biglandulosum* (the notorious "horizontal"), and a very beautiful Epacrid, *Archeria serpillifolia*, flowering most profusely, and very fragrant.

In the sub-alpine meadow, mostly composed of the tussocky *Poa cæspitosa*, with a sprinkling of ten or twelve other grasses, *Carpha alpina*, *Elynanthus capillaceus*, and *Luzula campestris*, are fine clumps of *Gentiana saxosa*, Diplarrhena, and many composites, such as Celmisia, *Craspedia Richea*, *Podolepis acuminata*, *Helichrysum scorpioides*, *Helipterum incanum*, *Lagenophora Billardieri*, and *Helichrysum bracteatum*, this last presenting a most beautiful sight, with colours ranging from light gold to bronze. Almost the only novelties here are the tiny prostrate *Rubus Gunnianus*, with handsome varnished leaves, large white or yellowish flowers, about three-quarters of an inch in diameter, and bright red fruits, and the still smaller *Coprosma Moorei*, bearing a large blue berry, one-third of an inch long.

In the dwarf scrub occupying the lower part of the valley and a good area of the slopes, *Oxylobium ellipticum*, *Epacris lanuginosa*, *E. microphylla*, *E. serpillifolia*, *Hibbertia angustifolia*, *Melaleuca squamea*, *Comesperma retusum*, *Patersonia glauca*, and *Calostrophus lateriflorus* are soon recognized. The endemics chiefly helping to compose this association are *Bellendena montana* (recently figured in the September number of the *Naturalist*), *Baeckea leptocaulis* (differing from *B. Gunniana* only

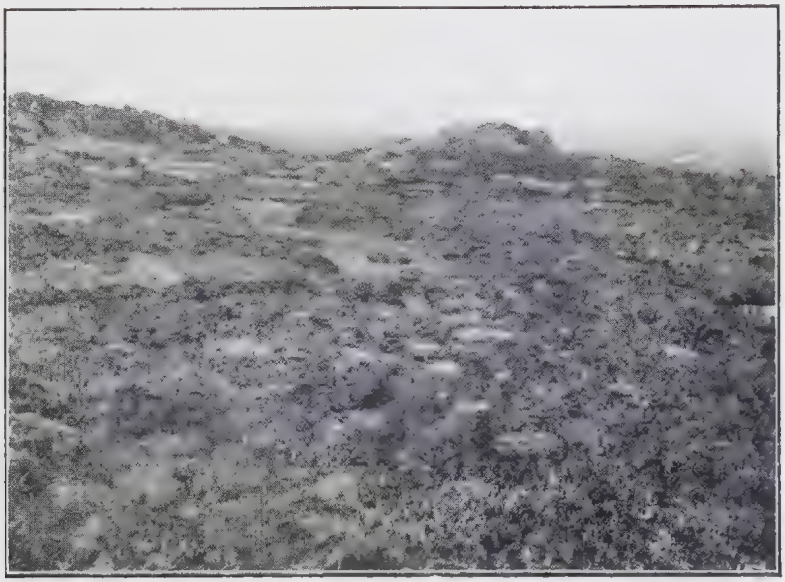
in having five instead of seven to ten stamens), *Boronia citriodora* (which gives off a delightful fragrance of lemon-thyme as one walks through it), *B. rhomboidea* easily distinguished by its round leaves, and a small Leptospermum, *L. rupestæ*. Less conspicuous but even more interesting members are *Campynema lineare*, an irid about six inches high, with small greenish flowers and bright red anthers, long considered monotypic until another was recorded from New Caledonia three years ago; the smaller composite *Abrotanella scabigera*; and the minute *Actinotus bellidioides* and *A. suffocata*, not an inch high, and suggesting no kinship with the handsome Flannel-flowers of New South Wales.

Growing in a corner of the Dove Lake, within a few inches of the water, and not noted elsewhere, is the slender little *Forstera* (*Phyllaene*) *bellidifolia*. It has a dense rosette of leaves and a stem a few inches long, bearing one or two tiny white flowers, and belongs to a genus consisting of few species, found principally in New Zealand and the extreme south of South America. Another waterside plant, though it also grows amongst the rocks of the plateau, is the handsome *Blandfordia marginata*, a lily with clusters of flowers quite an inch and a half long, of a brownish-red outside and yellow inside. This genus also has representatives in New South Wales.

Coming now to the plateau, we meet with other familiar species *Ranunculus Gunnii*, *Stylidium graminifolium*, *Euphrasia Brownii*, *Drosera arcturi*, *Dichosciadium* (*Azorella*) *ranunculaceum*, Astelia, *Blechnum penna-marina*, *Gleichenia dicarpa*, and Caltha—the last thick-set in mats with *Diplaspis cordifolia* in one gully only.

The plateau (see Plate xiii.) has all the characters of a *fell-field*, and the growth, except in sheltered places, is not much more than a foot or so high. The Podocarpus of our mountains is here associated with Microcachys, another dwarf pine, sometimes quite prostrate from the violence of the winds. From amongst this appears the beautiful *Anemone crassifolia*, the only representative of the genus in Australia, with white flowers as large as the garden variety. The two Helichrysums, *H. Milligani* and *H. pumilium*, with pinkish bracts, are Everlastings. Another composite, *Ozothamnus ledifolius*, was thought to be peculiar to Tasmania until Mr. Cambage discovered it a few years ago on Bimberi Peak, in the Federal Capital Territory. *Milligania densiflora* is a handsome lily with a profusion of creamy flowers on a stout stalk, growing in the gullies just off the plateau, and not very common. Still less frequent is an Antarctic species, *Ourisia integrifolia*, growing in crevices of the dolerite high up, and *Aciphylla procumbens*, unlike those on the mainland, in dense mats on ledges in the same situation. Most of the plants are markedly sclerophyllous, instances being *Richea acerosa* and the two others before-mentioned, two *Orites*

PLATE XIII.



THE "CUSHION-PLANT" ASSOCIATION, CRADLE MOUNTAIN.

EWARTIA MEREDITHÆ (F. v M.), Beauverd.

Photos. C. S. SUTTON.

with stiff, pointed leaves, *Sprengelia incarnata*, very much dwarfed, *Cyathodes straminea*, *C. glauca*, and *C. adscendens*. One fine Pimelea with silky, silvery leaves is abundant in certain places.

Many others might be mentioned, for there are well over 120 species on the plateau, many of those occurring in the lower situations also appearing here; but space will not permit further references except, very shortly, to the most characteristic feature of the flora in this station—the *cushion* plants —which cover wide areas, sometimes on bare rock, and again in wide, shallow valleys, where they are half-smothered by a dense growth of prostrate Microcachys. These curious growths, which have their counterparts in New Zealand and Antarctic South America, but are missing from Australian mountains, might be better described as "boulder" plants, for they are nearly as hard. They dominate the vegetation of the plateau, which has all the characters of a *fell-field*. Mostly they are rounded, about a foot (more or less) high and one to three feet across, but on rocky surfaces they are flatter and more extensive. Two of them, *Dracophyllum minimum*, an Epacrid, and *Donatia novæ-zealandiæ* (Stylidiaceæ), offer a very perfect instance of epharmonic convergence, or the adoption under the influence of the same extreme conditions, although widely separated systematically, of identical growth forms. They are both dark green, bearing white flowers flush with the surface, and the only outward difference is that the corolla lobes of the former are more spreading. The other two species, not so hard, are composites—*Ewartia Meredithæ* (see Plate xiii.), a pleasing russet colour, bearing small "everlastings," and *Pterygopappus Lawrencii*, grey or sage-green, with very minute flowers without spreading bracts. Although usually growing separately, the "cushion" plants are frequently found mixed, all four even being found in one large "cushion," when very curious and beautiful mosaic effects are produced, reminding one of the wool-worked tops of the old-fashioned box ottomans of Victorian times.

The plateau association, which, of course, is not confined to the Cradle Mountain, inasmuch as it contains so many endemic species and so many with Antarctic relations, is of particular interest, more especially to us, seeing it has probably no parallel on the mainland, and it is to be hoped it will not much longer remain without the intensive study it so well deserves.

The sketch map, reproduced from Dr. Benson's paper on "Notes on the Geology of the Cradle Mountain District" (Proc. Roy. Soc. Tas., 1916), will no doubt be useful to plant-lovers and others visiting this paradise for naturalists.

[The paper was illustrated by a large series of lantern slides of scenery, trees, shrubs, and flowering plants.—ED. *Vic. Nat.*]

BIRD NOTES.

The Yellow-tufted Honey-eater.—Of the thirty-four different species of Honey-eaters inhabiting Victoria, the Yellow-tufted, *Ptilotis auricomis*, is almost unsurpassable for its beauty. The bright yellow and dark brown feathers contrast so strikingly in the sunshine that it is justly entitled to its place amongst Australia's most beautiful birds. Like most Honey-eaters, it is never quiet, always dashing in swift flight through the scrub or disporting itself amongst the branches of flowering box-trees. The Yellow-tufted Honey-eater is a dweller of the central and northern parts of Victoria as well as New South Wales and Southern Queensland. It is rarely seen south of the Dividing Range, but in the patch of mallee country north of Melton a colony of these birds has been known to exist for many years. They are gradually increasing and spreading over a wide area of that locality. They do not, however, frequent the scrub on the dry hill slopes, but prefer to remain in the vegetation bordering the permanent water-courses. In the valley of the Djeriwarrh Creek, just beyond Melton, a nest was found placed in a cluster of flowering Clematis, which made a unique picture for a camera. During the breeding season the birds are very timid, especially when eggs are in the nest ; however, once the young ones are hatched the parent birds lose much of their timidness, and will approach quite close to any person who may be near the nest. They possess the usual pugnacious habits of nearly all Honey-eaters in attacking other birds with which they come into contact. The Yellow-tufted Honey-eater has a congener in the Helmeted Honey-eater, *Ptilotis cassidix*, which is very rare now, and confined only to the scrubs of Gippsland. Though both birds are widely separated from each other, yet at times the Yellow-tufted becomes nomadic and wanders into Gippsland. In October, 1921, a pair was seen in the short tea-tree scrub near the arm of Lake Tyers, at Nowa Nowa. This discovery was quite unexpected, as Gippsland had not previously been recorded as a habitat of this bird.—D. Dickison.

A Falcon Note.—Near the Werribee River, at Melton, on 6th August, 1922, a Little Falcon, *Falco lunulatus*, was flushed from a box-tree carrying a bird in its talons. Being anxious to determine the species of the victim, I followed the Falcon from tree to tree. It would seldom fly more than fifty yards before perching again, as its prey seemed a heavy burden, and also militated against its flight. Once, when making a short flight, some Magpies attacked it so furiously that the Falcon dropped its victim, which, on examination, proved to be a fully-grown Rosella Parrot, *Platycercus eximius*. It was practically

plucked of its feathers, and decapitated. After the encounter the Falcon remained in a tree near where the Parrot was dropped, apparently waiting to recover it on my leaving the locality. From this it is quite conclusive that Little Falcons cannot successfully carry birds larger than Parrots; yet, for wantonness, they have been known to kill Ducks and Herons by their tragic striking powers. In cases of such large birds being killed, it may be assumed that they are left on the ground for Crows and birds of prey to feast upon.—D. DICKISON.

THE ADVISORY COMMITTEE ON THE EXPORTATION OF AUSTRALIAN MAMMALS AND BIRDS.—It will be learned with satisfaction that the Minister for Trade and Customs, the Hon. Austin Chapman, M.H.R., has decided to appoint advisory committees in each of the State capitals, to whom all applications for the export of native animals and birds will be referred in the first instance. That for Melbourne is the first constituted, and, until the others are appointed, will act for the whole of Australia. The committee consists of seven members, representing different interests, and seven deputy members, who will act in the absence of the regular member from any unforeseen cause. The Melbourne committee is constituted as follows:—Representing the University and learned societies, Sir Baldwin Spencer, K.C.M.G., F.R.S., and Prof. W. Agar, M.A., F.R.S. (the second name in each case is that of the deputy); Zoological and Acclimatization Society, Dr. Colin Mackenzie and Mr. A. Currie; Museums, Mr. J. A. Kershaw and Mr. G. Hill; Ornithologists' Union, Dr. J. A. Leach and Mr. A. J. Campbell; Field Naturalists' Club and kindred societies, Mr. F. G. A. Barnard and Mr. J. L. Menzies; National Parks Association, Mr. W. F. Gates, M.A., and Mr. R. H. Croll; and Society for Prevention of Cruelty to Animals, Mr. A. T. Latham and Dr. G. Horne. At the first meeting of the committee Sir Baldwin Spencer was elected chairman, Dr. J. A. Leach hon. secretary, and Mr. A. T. Latham hon. assistant secretary. Several matters of importance were dealt with, and it is expected that the export of our native birds particularly will be so regulated that the great waste of life which has been taking place for years past will be greatly minimized.

QUEENSLAND INSECTS.—Lovers of entomology and others who are unacquainted with the wonders of tropical insects should not fail to visit the exhibition of Queensland and New Guinea insects now being shown at the Queen's Hall, Collins-street, Melbourne, by Mr. F. P. Dodd (member of F.N. Club of Victoria), of Kuranda, N. Qld. The specimens are not systematically arranged, as would be done in cabinet drawers,

but rather so as to contrast colours or call attention to points of resemblance or difference, &c., and are, therefore, easily appreciated by all. The collection represents the work of over twenty years, and is probably unique. The patience which has been exercised in arranging some of the cases is also well worth admiration.

For Microscopists.—An excellent medium for mounting small insects, such as Hemiptera, Diptera, &c., known as Amann's chloralphenol, may be prepared as follows:—Chloral hydrate, 2 parts, phenol (pure carbolic acid), 1 part; mix and liquefy by heat. Kill the specimen in hot alcohol; after a few minutes transfer to the chloralphenol, either in a large drop on the slide or in a small test-tube. This secures clearing and dehydration, when the specimen can be transferred directly to xylol balsam.—J. Searle.

The Red-backed Spider.—In the October *Naturalist* there appeared a report of the discussion on Mr. S. Butler's paper on "Spiders." I was very much surprised to note that any doubts were expressed by members as to the poisonous nature of the bite of the Red-backed Spider, *Latrodectus scelio*. Some years ago the late Mr. C. Frost investigated this subject and communicated his results to the *Victorian Naturalist*,* in which he gave a number of instances of the severe symptoms resulting from the bite. As a practising medical man I have had to treat persons suffering from the effects of this spider's bite every year for the last twenty years or more, and have been bitten myself. The bite itself is scarcely felt, and there is little local reaction—only a small red spot marking the site. A burning pain soon manifests itself, and in less than half an hour there follow severe darting and lancinating pains in the extremities, mostly in the lower limbs. Unless allayed by morphia, given hypodermically, from $\frac{1}{3}$ to $\frac{1}{2}$ grain being often necessary to make them bearable, they last for several hours, and in a less severe form for days. Cold sweatings, headache, and tremors follow, lasting for sometimes a month before they gradually die away. As a rule, a man is able to resume his usual occupation in a week's time. I have often seen men rolling and writhing with the pain, groaning, and even crying. Severe abdominal pains are sometimes caused, with numbness of the limbs. The symptoms produced are far more severe than those that follow the bite of the smaller venomous snakes. We have large scorpions inhabiting the sand-hills, and centipedes are common; but the bites of either of these are as nothing compared with that of *Latrodectus scelio*.—W. Macgillivray. Broken Hill, N.S.W., 11th Oct., 1923.

* *Vict. Nat.*, January, 1891 (vol. vii., p. 140).

Vol. XL.—No. 8. December, 1923.

The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria.

Published 6th December, 1923.

Hon. Editor: F. G. A. BARNARD, Esq.

The Author of each article is responsible for the facts and opinions recorded.

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1923.

Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 10th DECEMBER, 1923.

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBER—	PROPOSER.	SECONDER.
Mr. H. M'Coll, 97 Walpole-street, Kew.	Mr. F. G. A. Barnard.	Mr. A. D. Hardy.
AS COUNTRY MEMBER—		
Miss J. Galbraith, "Dunedin," Tyers, *Via* Traralgon.	Mr. H. B. Williamson, F.L.S.	Mr. C. Oke.

3. Nominations for Membership.

4. General Business.

5. Remarks by Exhibitors relative to their Specimens.

   Ten minutes' adjournment for discussion of Exhibits.

6. Reading of Papers and Discussion thereon.

   By Mr. J. Searle—"The Microscope and What it Reveals" (illustrated by lantern slides).

   The committee will be pleased to receive promises of papers for future meetings.

7. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

   Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and *Naturalist*. Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Club year ended on 30th April last. Any subscriptions overdue should be forwarded to the Hon. Treasurer *at once*.

Subscriptions for 1923–4 are due, and should be paid to the Hon. Treasurer as early as possible.

The Hon. Treasurer requests that members who received tickets for sale for Wild-flower Exhibition will settle for them as early as possible, so that the accounts may be closed.

The Victorian Naturalist.

Vol. XL.—No. 8. DECEMBER 6, 1923. No. 480.

FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 12th November, 1923.

The president, Mr. C. Daley, B.A., F.L.S., occupied the chair, and about fifty-five members and visitors were present.

REPORTS.

A report of the excursion to Mooroodue (Mornington Peninsula) on Saturday, 20th October, was given by the leader, Mr. L. Thorn, who said that the attendance was rather small, members perhaps being afraid of the somewhat long walk back to Frankston. However, the outing proved very interesting, and a large number of birds, insects, and plants were noted.

A report of the excursion to Eltham on Saturday, 27th October, was, in the absence of the leader, Mr. W. C. Tonge, read by Mr. A. L. Scott. The report stated that a large number of nests of various birds had been located. Owing to the recent floods not so many birds were seen along the creek as on previous excursions; still, a very interesting afternoon had been spent, and members enjoyed the lovely weather prevailing.

A report of the excursion to Yarra Junction on Saturday, 27th October, was given by the leader, Mr. F. G. A. Barnard, who said that, owing to the distance from town, the winter time-table, which is in use in October, allowed little time for collecting. Half a dozen members joined in the excursion. On reaching Yarra Junction, the Powelltown steam tram was taken as far as Black Sands, close to the creek of the same name. Here a variety of interesting flowering shrubs were met with, the most conspicuous of which was *Oxylobium ellipticum*; this was in fine form, bearing masses of deep orange, pea-shaped flowers. The climbers *Clematis aristata* and *Tecoma australis*, Wonga Vine, festooned many of the trees. The Mountain Grevillea, *G. alpina*, the Lemon Crowea, *Asterolasia* (*Eriostemon*) *Muelleri* (*correifolius*), were attractive small shrubs. Many other plants were noted during a short walk along the creek, but the time was too short for much to be done. The picturesque valleys of various creeks of the district which flow into the Little Yarra would afford good collecting-grounds if they were not so far from town. Two of the party spent the week-end at West Warburton, where, also, in the valley of Yankee Jim's Creek, they were delighted with the fine show made by *Pultenæa daphnoides*, Large-leaf Bush-Pea, and *P. Muelleri*, Fragrant Bush-Pea, which were at their best. On

the lower ground *Dillwynia cricifolia*, Heathy Parrot-Pea, was very attractive.

A report of the excursion to Healesville on Saturday, 3rd November, was given by the leader, Mr. H. B. Williamson, F.L.S., who said that the attendance was very small. The day was spent in the direction of Mount Riddell, and a number of interesting orchids met with. The Bronzy Caladenia, *C. viridescens*, Rogers, and some specimens of a small variety of *C. carnea*, Pink Fingers, with red tips to the sepals, were the first finds. Many specimens of the Common Bird-orchid, *Chiloglottis Gunnii*, were also noted, some being in flower. Further on, *Cryptostylis longifolia*, Large Tongue-orchid, and *Chiloglottis reflexa*, Autumn Bird-orchid, were collected. As it was a likely place for Leek-orchids, Prasophyllums, some time was spent in the search for them, with little success. Here the Nodding Blue-lily, *Stypandra glauca*, was in good form, and relieved the monotony of the scrub. A nest of the Yellow-breasted Shrike-Robin was found in a sapling only about five feet from the ground. It had no soft lining, simply dry gum-leaves, on which two unfledged young birds rested. The outside was decorated with hanging strips of bark about four inches long. A resident in the neighbourhood, hearing of our presence, kindly invited us to inspect his garden, where he is cultivating a number of Australian shrubs with great success.

A report of the excursion to the Brisbane Ranges on Saturday, 10th November, was given by Mr. H. B. Williamson, F.L.S., who said that, owing to the distance from town (about forty-five miles), combined with the difficulty of access, the attendance was small, but the results were decidedly interesting. The locality was well worthy of a visit by plant-lovers, especially a little earlier in the season. Those who went were pleased with the outing, and deeply indebted to Rev. A. C. F. Gates, M.A., of Lara, for having come so far from home (forty-five miles) and placed his car at their disposal.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Beatrice Bolton, 10 Shelley-street, Canterbury, and Mr. F. A. Hughes, Poath-road, Oakleigh, were duly elected ordinary members, and Rev. A. C. F. Gates, M.A., Lara, a country member of the Club.

GENERAL BUSINESS.

The hon. treasurer said that he could not give a complete statement *re* the recent exhibition of wild-flowers, as all the tickets issued had not yet been accounted for, but at present there was a credit balance of about £105. There might, however, be some slight expenditure still to be met. Mr. E. E. Pescott, F.E.S., said that the reason for the absence of flowers

expected from Western Australia was due to a misunderstanding as to the date of the exhibition.

Mr. L. Hodgson referred to the hospitality offered to the members attending the recent excursion to Eltham, and moved that a letter of thanks be sent to Mr. and Mrs. W. C. Tonge. Seconded by Mr. A. L. Scott, and carried unanimously.

PAPERS READ.

1. By Messrs. A. N. Burns and L. Thorn, entitled "Four Weeks' Collecting (Entomology) in Northern New South Wales and Southern Queensland."

The authors gave some account of butterfly-hunting in the scrubs of the Richmond River district, where they had been successful in taking a number of interesting species, as well as larvæ and pupæ. From Ballina they went to Tweed Heads, and thence by rail to Brisbane. From there a visit was paid to Palmwoods, about sixty miles north, on the Gympie line, this being the nearest station to the Blackall Ranges, celebrated for their wealth of tropical vegetation and insect life. Here, again, they were very successful, and added a number of untaken species to their lists.

In the discussion which followed some interesting remarks were made by Messrs. Daley, Davey, Coghill, and Barnard. Mr. Coghill referred to the glorious vegetation of the Blackall Ranges, and Mr. Barnard to the attractive sight of the large Papilio and Bird-wing butterflies flying lazily from tree to tree. He also called attention to the exhibition of Queensland insects now being made at the Queen's Hall, Collins-street, by Mr. F. P. Dodd, of Kuranda, North Queensland, a country member of the Club, which would doubtless charm every member who could spare a few minutes for its inspection.

2. By Mr. J. C. Goudie, entitled "Notes on the Coleoptera of North-Western Victoria, Part X."

In this part the author dealt with the Cleridæ, small but handsome beetles frequenting flowers; the Lymexylonidæ, a very small group; the Ptinidæ and the Bostrychidæ, small families of wood-boring beetles which do considerable damage to trees and shrubs, including fruit-trees, also to furniture and domestic utensils.

Mr. H. W. Davey, F.E.S., said he was pleased that a further part of Mr. Goudie's interesting series had been presented to the Club. The author was the first to take up the collecting of "ant-nest" beetles in Victoria, and had recorded a number of interesting species from the Sea Lake district.

Mr. C. Oke referred to the great value of Mr. Goudie's work, but regretted that the intervals between the parts were rather long.

NOTES ABOUT EXHIBITS.

Mr. H. W. Davey, F.E.S., called attention to his exhibit of a millipede and a parasitic worm from Papua, and gave some account of the life-history of the latter. He also exhibited some small ptinid beetles which had bred and lived in cayenne pepper.

Mr. F. G. A. Barnard called attention to the flowering stems of a liliaceous plant from South Africa, which were picked in Capetown about five weeks before, the flowers having developed since arrival in Melbourne.

[This has since been identified at the National Herbarium as the White Star of Bethlehem, *Ornithogalum lactum*, Jacq.—Ed. *Vict. Nat.*]

EXHIBITS.

By Mr. F. G. A. Barnard.—Flowers of *Ornithogalum lactum*, Jacq., White Star of Bethlehem, stems picked at Capetown, S.A., five weeks previously.

By Mr. C. Daley, F.L.S.—Flowering branches of *Olearia* (*Aster*) *argophylla*, F. v. M., Musk Daisy-bush, and *Prostanthera nivea*, A. Cunn., Snowy Mint-bush, grown in his garden at Caulfield.

By Geological Survey of Victoria, per Mr. A. E. Rodda.—Pebbles, polished by glacial action, from Inverloch, Vic.; gypsum crystals ("arrowhead type") from Ouyen, N.W. Vic.

By Mr. L. Hodgson.—Spider-orchids, *Caladenia Patersonii*, and Crimson Kunzea, *K. parvifolia*, from Grampians.

By Mr. C. Oke.—Gizzard (proventriculus) of Black Cricket (under microscope).

By Mr. L. Thorn. Two cases containing fifty-eight species of butterflies and eighty species of moths, collected at Narrabeen, near Sydney, the Richmond River district, New South Wales, and the Blackall Ranges, Queensland, during October, 1922, in illustration of paper; cast skin of tree-snake; leaves of Nettle-tree; pods of Moreton Bay Chestnut; and photographs taken during the trip.

After the usual conversazione the meeting terminated.

A Beetle Note.—*Stigmodera flavocincta*, C. & G.—While investigating the workings of some wood-boring larvæ in the stem of a sapling Yellow Gum, *E. leucoxylon*, I split a section of the trunk, about six inches in diameter, down the centre, and disclosed two examples of this fine Buprestid beetle. Both had perished, having apparently been unable to make their way out through the thick bark. This beetle measures about $1\frac{1}{2}$ inches in length, has the disc of the prothorax black with yellowish margins, and the elytra reddish-brown. Although not a rare species—I often saw it in the Mallee, and it is found in most collections—this record of one of its food plants may be of interest to other collectors.—J. C. Goudie, Maldon.

EXCURSION TO MOOROODUC AND FRANKSTON.

Only a few members took part in the Moorooduc to Frankston excursion on Saturday, 20th October. Perhaps they were frightened by the propect of a rather long walk. During the train journey between Frankston and Langwarrin the hills each side of the line were seen to be covered with white flowers, mostly of the Silky Tea-tree, *Leptospermum myrsinoides*, and the Wedding-bush, *Ricinocarpus pinifolius*. On reaching Moorooduc the party followed the track leading to the stone quarry on the side of Mount Eliza. Growing on each side of the track was a fine patch of Swamp Paper-bark tree, *Melaleuca ericifolia*, whose flowers gave off a very sweet scent. A large number of Hymenoptera (wasps and bees) were observed flying around the flowers, also two Nymphalid butterflies, the Red Admiral, *Pyrameis itea*, and the Blue-spotted Painted Lady, *P. cardui kershawi*; the latter were flying about the flowers in large numbers. Passing the engine-house and quarry buildings, we followed the track leading to the top of the mount. This track, a part of the distance, runs by the side of a wooden chute used for sliding firewood down to the mill. On reaching a position on the top of the mount a splendid view of the surrounding country was obtained. On the east the waters of Western Port Bay were plainly seen, and on the west a large expanse of Port Phillip Bay, from Frankston to Ricketts' Point, Beaumaris being visible. Looking south across the Mornington Peninsula we obtained a fine view of the Two Bays nursery. The fields surrounding the nursery were covered with the yellow flowers of the introduced Cape Weed, while large patches of Red Sorrel afforded a pleasing contrast. In the distance was a range of hills terminating at Mount Martha. Working our way down the slope of the mount, three species of small moths of the genus Philobota were flying about in large numbers. Four species of orchids were also observed, the most common being the purple Wax-lip Orchid, *Glossodia major*. A pair of Jewel or Flower Beetles of the family Buprestidæ were secured on the flowers of the Manuka, *Leptospermum scoparium*. A fine specimen of the Blue-tongue Lizard, *Tiliqua scincoides*, was found basking in the sun. This lizard did not like being disturbed, and resented our presence by opening its mouth and putting out its blue tongue at us. Several other large rough-backed lizards were observed running around the bushes ahead of us. One specimen climbed on top of a post-and-rail fence to get a better view of the intruders; another of the same species climbed a small eucalypt sapling to a height of at least fifteen feet. Finding a shady spot under a Cherry Ballart, we decided to have lunch. Whilst having our frugal repast three welcome strangers paid

us a visit. One, a Harmonious Shrike-Thrush, flew down on the ground beside us to pick up a piece of bread. The second was a Spinebill Honey-eater, which gave us a five minutes' exhibition of preening the feathers on its wings and breast. The other visitor was a White-shafted Fantail, which darted around the cherry-tree, feasting on insects. The Drooping Mistletoe, *Loranthus pendulus*, was very plentiful on the eucalypts on the hillside. The larvæ of the Common Mistletoe Blue Butterfly, *Ogyris olane*, feeds on the leaves of this mistletoe. The larvæ are night feeders, hiding under the loose bark on the trees during the day. After taking the bark off several of the trees with a screwdriver, I found a full-grown larva and a number of empty pupa cases, the perfect insects having emerged. On a large eucalypt tree Common Mistletoe was noted, *Loranthus celastroides*, on which the larvæ of the Scarce Mistletoe Blue Butterfly, *Ogyris abrota*, feed. A couple of Wattle-birds were observed on the bunches of mistletoe extracting honey from the flowers. These birds are fairly plentiful along the coast when the Banksias are in flower, and may be seen in all kinds of attitudes securing honey and catching small insects on the flowers. Until mid-day most of our collecting was done on the slope of Mount Eliza. We then decided to go down to the three-chain road which runs from Mooroodue railway station to the Hastings road, a distance of about three miles. Growing in a paddock on the side of the road we noticed a fine patch of the Silky Tea-tree, *Leptospermum myrsinoides*, in flower, and spent some time searching the flowers for buprestid beetles, without success, although a large number of Hymenoptera (flower wasps of the family Thynnidæ) and three or four species of our native bees of the family Apidæ were noted on the flowers. Three small species of moths of the family Geometridæ were captured, one species being quite new to me. Several fine specimens of Spider-orchids were noticed growing in the shade of eucalypt trees. Two species of Acacia, *Acacia armata* and *A. verticillata*, were in flower, also the Coast Tea-tree, *Leptospermum lævigatum*. The afternoon was fairly warm, and, as members of the party were feeling thirsty, we decided to pay a visit to the Frankston Reservoir, which is situated about a mile from the three-chain road going towards Frankston and about a quarter of a mile from the Hastings road. We boiled the billy and had afternoon tea in the shade of a eucalypt tree. While we were having an enjoyable rest a number of mosquitos paid us a visit and forced us to move on again. We then followed the pipe track, which leads on to the Frankston Hills estate. The hills were covered with white flowers, mostly *Leptospermum myrsinoides* and the Wedding-bush, *Ricinocarpus pinifolius*. Several specimens of a

small robber fly of the family Asilidæ were noted, also four species of Lycænid butterflies—the Common Blue, *Zizina labradus*, Double-spotted Blue, *Nacaduba biocellata*, Blotched Blue, *Candalides acasta*, and the Dusky Blue, *C. hyacinthina*. The Blue-spotted Painted Lady was flying about the flowers in large numbers. While beating the bushes of *Aotus villosa* I secured three larvæ of a small Lycænid, the Fringed Blue, *Neolucia agricola*. Last year I secured three or four larvæ feeding on the same food plant at Cheltenham, and on the Bendigo excursions a number of the larvæ were found feeding in the flowers of the Gorse Bitter-Pea, *Daviesia ulicina*, a different species of food plant. After having spent a most pleasant and enjoyable day we reached Frankston in time to catch the 6 p.m. train to town.

The following twenty-four species of birds were seen during the day:—Harmonious Shrike-Thrush, Spinebill Honey-eater, White-shafted Fantail, Bronze-wing Pigeon, White-fronted Heron, Rosella Parrot, Kookaburra, Pallid Cuckoo, Bronze Cuckoo, Wood-Swallow, Yellow-breasted Shrike-Robin, Blue Wren, Yellow-tailed Tit-Warbler, Wattle-bird, Red-browed Finch, Spotted-sided Finch, Butcher-bird, Spur-winged Plover, Noisy Miner, and five species of introduced birds—Starling, Sparrow, English Blackbird, Green Linnet, and Goldfinch.—L. Thorn.

CENSUS OF VICTORIAN PLANTS.

The following additions and alterations have been made to the "Census of Victorian Plants" by the National Herbarium authorities:—

Additions.

Page 26.—Bassia tricornis, F. v. M. ..	..	Three-horned Salt-bush	N.W.
„ 64.—Minuria denticulata, Benth.	..	Toothed Minuria..	.. N.W.
„ 65.—*Centipeda thespidioides, F. v. M.		Desert Sneezeweed	.. N.W.

(All collected at Mildura, September, 1923, H. B. Williamson.)

Authentic Localities for Doubtful Plants.

„ 65.—Elachanthus pusillus, F. v. M.	..	Elachanth..	.. ..Delete "Murray."
„ 66.—Chthonocephalus pseudevax, Steetz		Groundheads	.. ..Delete "Murray."

(Both collected at Merrina, south-west of Mildura, September, 1923, H. B. Williamson.)

New Localities.

Page 13.—Chorizandra enodis, Lehm...	..	Black Bristle-rush	.. S., Lara (Rev. A. C. F. Gates).
„ 21.—Diuris palachila, Rogers ..	..	Broad-lip Diuris	.. N.E. (Beechworth, J. W. Audas, Sept., 1923).

* Removed from page 71.

THE FOSSILIFEROUS BEDS OF VIOLET CREEK, NEAR HAMILTON.

BY FREDK. CHAPMAN, A.L.S., Palæontologist, National Museum, Melbourne.

(*Read before the Field Naturalists' Club of Victoria, 10th Sept.*, 1923.)

(1) *Early Reference to Locality.*—In 1870 Prof. P. M. Duncan published his classic paper on "The Fossil Corals of the Australian Tertiary Deposits." * This was chiefly based on a collection of fossils made by the Victorian Geological Survey some years earlier, and sent to Duncan by the then Director, A. R. C. Selwyn. This collection was supplemented by examples furnished by Tenison-Woods and a few which Duncan found in the Museum of the Geological Society of London.

Amongst these corals was a species which Duncan named *Caryophyllia viola,*† since transferred to the genus *Deltocyathus*. The trivial name was derived from its discovery at Violet Creek, a stream which runs parallel with the Muddy Creek, as the latter, with its tributary the Grange Burn, flows into the Wannon.

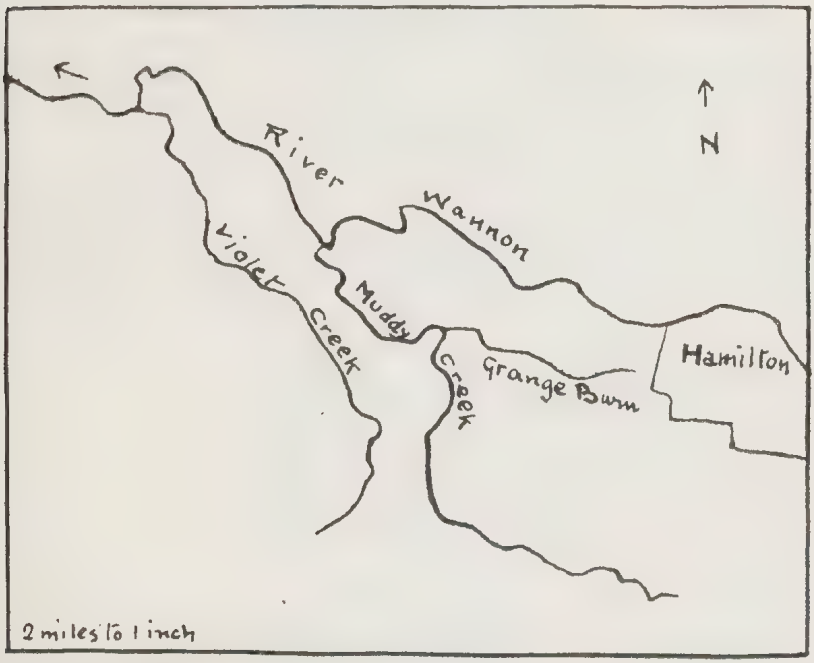
Scarcity of Outcrops.—Writing in regard to the strata of Western Victoria in 1889, the late Mr. John Dennant says ‡:—"In its course towards the Wannon, the Grange Burn is joined by two tributaries—viz., Muddy Creek § and Violet Creek. Although all three are insignificant streams, and confined now in narrow channels, yet the valleys through which they flow are not only wide, but depressed considerably below the level of the surrounding country. I have not observed any fossil outcrops in the Violet Creek, which is the more remarkable as they occur in so many places in both the Grange Burn and Muddy Creek."

(2) *Condition of Violet Creek Noted by the Writer.*—During a visit paid to the Hamilton district in December, 1905, accompanied by my son, W. D. Chapman, and Mr. L. R. Kurtze, of Hochkirch, I examined the area of the Violet Creek as far as possible after a strenuous walk on an especially warm day. We were so fortunate as to find several outcrops both of the Janjukian polyzoal rock and the Kalimnan beds, although the country round presents little opportunity for geological work on account of the thick subsoil. It is, therefore, easily conceivable that these Tertiary beds were so masked by hillwash that Mr. Dennant, on a cursory visit, overlooked them. We must here say a good word for the rabbits, whose work, as on

* Quart. Journ. Geol. Soc., vol. xxvi., part 3, pp. 284–318, pls. xix.–xxi.
† *Op. supra cit.*, p. 295, pl. xix., fig. 1.
‡ Trans. Roy. Soc. S. Australia, vol. xi., 1889, p. 31.
§ Slightly inaccurate; see map.

former occasions, was appreciated, by their turning out samples of the rocks from within their burrows. We thus first noticed the polyzoal limestone freshly excavated on the talus banks.

(3) *The Polyzoal Rock of Violet Creek.*—The rock is friable and of a rich yellow-brown colour. It resembles the finer-grained limestone of some parts of the Grange Burn section. Being largely composed of the small twiggy forms of polyzoa, with occasional foliaceous masses (*Macropora* and *Adeona*), it is almost purely polyzoal rather than foraminiferal. Its condition of sedimentation would probably be that of a com-



RIVER SYSTEM WEST OF HAMILTON.

paratively deep-water phase (about 50–100 fathoms) rather than a moderately shallow one (5–50 fathoms), as in the *Amphistegina* * and *Lepidocyclina* limestone of Grange Burn.

Some of the strata in the Mallee bores † resembled this rock in their comparative freedom from foraminiferal remains, but

* The *Amphistegina lessonii* of Grange Burn is the flattened and lenticular form of shallow water deposits, as distinguished from the dome-shaped variety.

† Chapman, F., "Cainozoic Geology of the Mallee and Other Victorian Bores," Records Geol. Surv. Vict., vol. iii., part 4, 1916.

they were not iron-stained, as in the case of the Violet Creek limestone. The absence of *Lepidocyclina* is striking, since this locality is only a few miles from Grange Burn, where it is abundant; but this may be accounted for by depth conditions, as noticed above.

A specimen of the rock collected above Mr. Francis's station contained the following fossils:—

FORAMINIFERA.

Fam. *Miliolidæ*.—
Miliolina bicornis, W. and J., sp.
,, *cuvieriana*, d'Orb., sp.
,, *seminulum*, L., sp.
,, *vulgaris*, d'Orb., sp.
Fam. *Textulariidæ*.—
Spiroplecta gramen, d'Orb., sp.
,, *sagittula*, Defr., sp.
Gaudryina rugosa, d'Orb.
Cassidulina subglobosa, Brady.
Fam. *Lagenidæ*.—
Nodosaria (*Dentalina*) *obliqua*, L., sp.
Polymorphina angusta, Egger.
,, *elegantissima*, P. and J.
,, *lactea*, W. and J., sp.
Fam. *Rotaliidæ*.—
Truncatulina refulgens, Montfort, sp.
Anomalina ammonoides, Reuss, sp.
,, *grosserugosa*, Gümbel, sp.
Carpentaria proteiformis, Goës.
Pulvinulina calabra, Costa, sp.*
,, *elegans*, d'Orb., sp.
Rotalia calcar, d'Orb.

ECHINODERMATA.

Echinoid spines, indet.

POLYZOA.

CHEILOSTOMATA.

Fam. *Cellariidæ*.—
Cellaria contigua, MacGill.
,, *rigida*, var. *perampla*, MacGill.
Fam. *Microporellidæ*.—
Adeona clavata, Stoliczka, sp.
Fam. *Schizoporellidæ*.—
Schizoporella nitens, MacGill.
Fam. *Smittiidæ*.—
Porina gracilis, M. Edw., sp.

* Previously recorded from the Mallee bore, *op. supra cit.*, p. 385, pl. lxiii., figs. 8 *a*, *b*.

CYCLOSTOMATA.

Fam. *Crisiidæ.*—
Crisia macrostoma, MacGill.
,, *scalaris*, MacGill.
Fam. *Idmoneidæ.*—
Filisparsa orakeiensis, Stol.
Hornera sulcata, MacGill.
Fam. *Tubuliporidæ.*—
Entalophora longipora, MacGill.
Fam. *Lichenoporidæ.*—
Lichenopora radiata, Adouin, sp.

(4) *The Fossiliferous Ironstone of Violet Creek.*—Higher up the valley of the Violet Creek, and in the bed of the stream, we found an ironstone with numerous casts and moulds of fossils. Very few of these could be determined, but the following typical Kalimnan fossils were recognized:—

Clausinella subroborata, Tate, sp.
Eglisia triplicata, Tate, sp.

This ironstone probably links itself with that of Stawell, in which, however, Janjukian fossils also occur, and of Redruth,* where a bird's feather and some *Banksia* and *Eucalyptus* leaves of modern specific forms were found and described some years ago by the writer.

(5) *Summary.*—From earlier evidence (Geol. Survey of Victoria, *supra cit.*) and from the present notes, it is assumed that the entire succession of the Tertiaries is present in Violet Creek—that is to say, from Balcombian to Kalimnan.

The occurrence of *Deltocyathus viola*, although found in the Otway and Barwon Tertiaries, here indicates a Balcombian horizon, since it is also a typical coral at Muddy Creek (Balcombian), and has not there occurred in the Janjukian of the Violet Creek phase.

The Janjukian horizon, with its polyzoal and moderately deep sea phase, herein described from this locality for the first time, is shown to belong to that age by its characteristic foraminifera, such as the abundant *Rotalia calcar*, and the rare *Pulvinulina calabra*, before found only in the Janjukian of the Mallee bores.†

The Kalimnan horizon is fixed by two typical fossils of a restricted Kalimnan facies. The tenacious ironstone beds of this stage show the Flemington and Keilor Janjukian ironstone phase to be extended later into the Kalimnan in this direction. The nature of the rock indicates a bog iron ore induced by swampy conditions impinging on a marine area, and this geographical aspect points to a larger rainfall than at present.

* Chapman, F., Proc. Roy. Soc. Vict., vol. xxiii. (n.s.), part 1, 1910, pp. 21–26, pls. iv.–v.

† Proc. Roy. Soc. Vict., vol. xxvi. (n.s.), part 1, 1913, p. 172, pl. xvi., figs. 8 *a*, *b*.

NOTES ON THE VICTORIAN CHLAMYDOPSINI (COLEOPTERA), WITH DESCRIPTIONS OF NEW SPECIES.

By Charles Oke.

(*Read before the Field Naturalists' Club of Victoria, 12th Feb.*, 1923.)

The minute beetles known as the Chlamydopsini have received various treatment at the hands of systematists. Westwood,* in 1869, proposed the genus Chlamydopsis for two species taken in Western Australia by the late F. H. Du Boulay, and King,† the same year, proposed the name Bizenia for a congeneric species from New South Wales; but, as Westwood's paper was issued first, his name has priority. Lewis,‡ in 1903, formed the genus Orectoscelis for a species taken in Queensland by F. P. Dodd, and transferred one of Westwood's species to it. Lea,§ in 1914, proposed Ectatommiphila and Pheidoliphila as two new genera at the expense of Chlamydopsis, putting two species in the former and five in the latter. Mjöberg proposed the genus Eucurtia for a specimen of *C. comata*, Blackb., a synonymy noted by Lea. Bickhardt, in Wytsman's "Genera Insectorum," treated these genera as forming the tribe Chlamydopsini, and, though he mentions Lea's genus Pheidoliphila (in litt.), he makes no reference to Ectatommiphila, but gives Eucurtia as a valid genus. Several of the species have been given a wrong habitat in Bickhardt's list.

Of the thirty-four described species belonging to this group, fifteen have been recorded for Victoria, and I now add six new species.

The following are the species known to occur in Victoria, the localities where they have been taken, and the ants they have been found associated with. All types, and a specimen of each species marked with an asterisk, have been deposited in the National Museum, Melbourne.

Family HISTERIDÆ.

Sub-family Hæterinæ.

tribe CHLAMYDOPSINI.

* *Chlamydopsis pygidialis*, Blackb.

Described from a specimen taken while beating dead leaves at Fernshaw, Victoria. It has also been taken at Beaconsfield (F. E. Wilson), Ferntree Gully (Oke, W. Du Boulay, J. E.

* Westwood, Trans. Ent. Soc., London, 1869, p. 317.
† King, Trans. Ent. Soc., N.S.W., 1869.
‡ Lewis, Ann. Mag. Nat. Hist., vol. xii. (7), p. 426 (1903).
§ Lea, Pro. Roy. Soc., Vict., vol. xxvi. (1914).
„ Mjoberg, Ent. Tidskrift, p. 121 (1912).

Dixon, F. E. Wilson), Belgrave, Healesville, Warburton, Yarra Junction, Emerald, Pakenham (Oke), always associating with a small black species of Chalcoponera. Length, 3.12 mm.

* Var. *minor* (n. var.)

A variety of this species occurs which is much smaller and more parallel than the usual form, and the edentations on the humeral angles are less distinct. Length, 2.4 mm. Hab., Victoria: Belgrave, Ferntree Gully (Oke), Beaconsfield (F. E. Wilson), in nests of Chalcoponera, sp.

* *Chlamydopsis formicicola,* King.

Described by Rev. King as *Bizenia formicicola* from specimens obtained at Liverpool, N.S.W., and has been taken in Victoria at Sea Lake (J. C. Goudie) and Bendigo (Oke).

* *Chlamydopsis epipleuralis,* Lea.

Described from specimens taken at Hornsby, N.S.W., in which State it appears to be a common species. The only Victorian specimens I have seen were taken near Whittlesea (Oke), in nest of *Iridomyrmex gracilis,* Lowne.

* *Chlamydopsis longipes,* Lea.

Described from specimens taken at Bannockburn, Victoria, by Mr. H. W. Davey, and has been recorded from South Australia. New localities: -Melton (Oke, W. Du Boulay), Bacchus Marsh (Oke), in nests of *Chalcoponera metallica,* Sm.

* *Chlamydopsis excavata,* Lea.

Described as from near Hobart, Tasmania. It has been taken in National Park, N.S.W. (W. Du Boulay, F. E. Wilson), and is now recorded from Victoria -Beaconsfield (F. E. Wilson), Belgrave, and Ferntree Gully (Oke), in nests of Chalcoponera, sp. ?

Chlamydopsis tuberculata, Lea.

Described from three specimens obtained at Ararat by Mr. H. W. Davey. It has since been taken at Lorne (F. E. Wilson), Grampians (E. Fischer), Macedon (Oke), in nests of *Iridomyrmex rufoniger,* Lowne. Both Mr. Wilson and Mr. Fischer have placed a specimen of this species in the National Museum collection.

Chlamydopsis ectatommæ, Lea.

Described from Sydney, N.S.W., now recorded from Victoria for the first time; Bacchus Marsh (Oke), in a nest of *Chalcoponera metallica,* Sm.; (?) Lakes' Entrance (F. E. Wilson).

* Var. *rufomaculatus,* n. var.

A variety of this species occurs, with the greater portion of the elytra a bright reddish-castaneous, thorax and appendages much darker, tip of elytra and body almost black. The lateral margins from apical quarter parallel, not "gently incurved to

middle." Length, 2.16 mm. (type); another specimen, 1.72 mm. Hab., Victoria: Melton, Bacchus Marsh (Oke), in nests of *Chalcoponera metallica*, Sm. This may be the variety mentioned by Lea (*Rec. S.A. Mus.*, vol. i.), but I think it is so distinctive in colouring that it should be named. The colour is, apparently, not due to immaturity, as I have kept a specimen alive for three weeks, during which time the colour did not darken, though it did after the specimens were mounted some months.

* *Chlamydopsis striatipennis*, Lea.

Described from a single specimen obtained at Lorne by Mr. F. E. Wilson. Other records are Whittlesea (C. Oke, Nov., 1908), Warburton, Ferntree Gully (C. Oke, F. E. Wilson), Belgrave, Emerald (C. Oke), in nests of Chalcoponera, sp.?, and a small black Iridomyrmex.

* *Chlamydopsis carinicollis*, Lea.

Described from a single specimen obtained at Beaconsfield by Mr. F. E. Wilson in nest of *Aphænogaster longiceps*. I have taken several specimens in nests of Chalcoponera, sp. ?, at Ferntree Gully and Upwey. This species varies greatly in size, ranging from 1.72 to 2.32 mm.

Chlamydopsis setipennis, n. sp.

Dark chestnut brown, in parts lighter, almost reddish; fascicles and setæ pale golden yellow. Head immersed in thorax when at rest, somewhat rounded, widest in front, gently narrowing to base, finely shagreened, with a few moderate punctures; face with large shallow reticulate punctures; eyes distinctly faceted. Antennæ moderately long; scape curved, its apical half thickened, in front with punctures as on face, behind finely shagreened; funicle short, seven-jointed, basal joint large, subcylindrical, second joint very fine at base, then increasing in thickness to club, which is long, subcylindrical, gently pointed. Prothorax distinctly transverse; front margin slightly elevated, and straight across median half, thence more elevated, at an oblique angle, to sides, then in a straight line to base; the lateral elevation gradually diminishes in height till it ceases at base; disc with dense reticulate punctures, and finely granulated. Elytra slightly longer than wide, a little wider than prothorax, with well-raised epaulettes, crowned by a large golden-yellow fascicle; basal depression rather small, but deep, with an impression running under the epaulettes and opening on the sides, on the epipleuræ (from this opening coarse striæ radiate in all directions); there is also an opening in front and behind epaulettes; the striæ in depression transverse behind scutellar region, then curving outward and down elytra; a large depression near hind angles. Pygidium with a

transverse row of sharp teeth. Under surface in parts with dense reticulate punctures, and short setæ; metasternum with a narrow median carina. Legs long; tibiæ compressed, thin, and angular, narow at base, fairly wide at apex, widest at end of tarsal groove, where the flange is cut off at an acute angle. Length, 2.16 mm.

Hab., Victoria: Ferntree Gully, Belgrave, Sassafras, Evelyn (C. Oke), in nests of *Notoncus forcli*, Andre, var. *dentatus*, Forel.*

This remarkable little beetle is literally covered with setiferous granules, being most apparent around margin of pronotum and elytra, on pygidium and propygidium; but if held on a plane with the eye, and looked at from in front or sides, they will be seen in all directions. Some specimens have the pronotum roughened, and some small nodules on disc, but this is generally absent.

At a casual glance this species somewhat resembles *serricollis*, Lea, but is very distinct by, *inter alia*, margins of thorax, clothing, and striæ of elytra. In Mr. Lea's tabulation of the genus it would be associated with *ectatommæ*, Lea, because of its transverse scutellar striæ; but *ectatommæ* has a very small fascicle, and not the clothing of the present species; the tibiæ are also differently shaped.

Chlamydopsis leai, sp. nov.

Very dark brown, in parts black, with distinct bronzy reflections, legs reddish-brown. Head immersed in thorax when at rest, rounded, with a few fine punctures; face slightly concave, with large, shallow, reticulate punctures; eyes very finely granulated. Antennæ long; scape long, basal half very narrow, then suddenly widened—in front with punctures, as on face, behind finely shagreened; funicle distinctly seven-jointed, first joint rather long and thick, second thin, then gradually increasing in thickness to club, which is thick, rather short, and sharply pointed. Prothorax strongly transverse, disc convex, with a short obtuse tubercle and dense reticulate punctures, and with short yellow setæ; frontal margin well elevated and slightly recurved; this central piece is not quite width of head (here there is a distinct break in margin); then a piece starts in front of but near ends of this central piece, and runs at an oblique angle to the sides, where it is unusually high, and forms a sharp point, then rapidly diminishes away; hind angles slightly rounded off; a narrow marginal line at base. Elytra subquadrate, narrowed at base, then suddenly widened; hind angles widely rounded off; epaulettes highly elevated, with sculpture as on pronotum; large sub-basal depression, its

* I am indebted to Mr. J. Clark, of Western Australia, for the identification of this ant.

sides vaulted, where there are some stiff yellowish hairs; depression highly polished, but with minute, hardly perceptible, setiferous punctures; a deep transverse impression near base, not opening on sides, but this is indicated by a small, shallow fovæ, towards which the striæ are directed; outside the depression the elytra are striated: a large fovæ at hind angles; near apices a few coarse setæ. Prosternum in front and sides with reticulate punctures, almost becoming transverse striæ in centre, between coxæ and mesosternum coarsely punctured. Metasternum and most of abdomen finely and sparsely punctured. Pygidium and propygidium sub-opaque, with reticulate punctures and conspicuous setæ. Legs long; tibiæ slightly angular, outside edge curved, tarsal groove on inside flat surface. Length, 3.5 mm.

Hab., Victoria: Ferntree Gully, Belgrave (C. Oke), July and December, in nests of Iridomyrmex,* sp. ?

This strongly-striated species somewhat resembles *striatipennis*, Lea, but may be easily separated from that species by, *inter alia*, the shape of the thorax, base of elytra, the clothing, and the striæ are coarser. In Mr. Lea's table it would be associated with *striatella*, Westw., from which it differs, *inter alia*, in the shape of the epaulettes and legs, and the puncturation of the under surface.

I have much pleasure in naming this species after Mr. A. M. Lea, who has done so much good work amongst the myrmecophilous coleoptera of Australia. The type is probably a female, the antennæ being as figured by Mr. Lea for *latipes*. I have a specimen from Sassafras, unfortunately damaged, which is probably the male. It is slightly smaller, and the antennal club is longer, thinner, and slightly curved. Length, 2.56 mm.

Chlamydopsis puncticollis, n. sp.

Black, or almost so; epaulettes, antennæ, and legs reddish-castaneous. Head immersed in thorax when at rest; face slightly concave, with rather large, clearly defined punctures. Antennæ fairly long; scape narrow at base, inflated near apex, with punctures, as on face; funicle short, first joint thick, second thin, then increasing in width to apex: club long, curved, subcylindrical. Prothorax strongly transverse, medio-basal two-thirds convex: front margin faintly bilobed, lightly elevated across width of head, then more elevated, with a strong inward curve to lateral margin, which is slightly sinuate, and not elevated beyond apical third, with coarse, dense punctures. Elytra subquadrate, with a rather deep transverse depression near base, reaching the sides, but towards each side concealed

* An undetermined species, which Mr. J. Clark thinks is probably undescribed.

by a raised humeral process, meeting a subhumeral process, bearing on their apex a golden-red fascicle attached to a membrane; in depression highly polished; beyond depression with well-defined striolæ, reaching, but becoming shorter near, apex. Prosternum and mesosternum, sides of abdomen, pygidium and propygidium with large reticulate punctures. Metasternum with an impressed longitudinal line. First joint of abdomen with a row of small punctures around basal margin. Legs fairly long; tibiæ strongly inflated, inflated parts rather suddenly cut off at termination of tarsal groove. Length, 2.28 mm.

Hab., Victoria: Ferntree Gully (C. Oke), from nests of Chalcoponera.

This species is perhaps nearer to *striatella*, Westw., than any other described species, but is easily separated from that species by (*inter alia*) pronotum glabrous and different subhumeral structure. From *atra*, Lea, it differs in the coarser and deeper puncturation of pronotum, smaller humeral processes, no ridge on scutellar region, and striæ not becoming punctures at apex of elytra.

The punctures on the pronotum of the present species are coarse and deep, and somewhat elongated in a line with the body.

Chlamydopsis strigicollis, n. sp.

Black; antennæ and legs reddish-castaneous. Head immersed in thorax when at rest; face with dense reticulate punctures. Antennæ rather long; scape thin at base, widened towards apex, with punctures as on face; funicle short, apparently six-jointed; club long, curved, subcylindrical. Prothorax transverse, convex, with short confluent striolæ and rather long pale setæ; front margin lightly elevated, straight, then more elevated and slightly curved to side, thence elevated to base. Elytra subquadrate, with a transverse sub-basal depression continued to sides, but hidden near the sides by raised humeral and subhumeral processes, nearly meeting, and crowned with a golden fascicle; near scutellar region is a raised ridge directed caudad; highly polished within the depression, beyond with fine but sharply-defined striæ to apex and sides; with very short pale setæ, except on humeral angles and scutellar region, where it is long. Epipleuræ with striæ converging on opening of depression. Prosternum and mesosternum, sides of abdomen, pygidium and propygidium with sparse, large, shallow punctures. Legs moderately long; tibiæ strongly inflated; inflated parts suddenly ending on front pair, leaving a sharp angulation, middle pair similar, but not so sharply angular, hind pair much less angular. Length, 2 mm.

Hab., Victoria: Hurst's Bridge, Belgrave, Ferntree Gully (C.

Oke), Beaconsfield (F. E. Wilson), Mooroolbark (E. Fischer), in nests of Chalcoponera, sp.

The sculpture of the pronotum is peculiar and distinctive. In the centre front there are a few punctures (almost round); then the striolæ are curved and run around the convex portion, on top of which they are transverse, and on the sides they run straight up and down. The clothing of the pronotum is more pronounced than on any other species known to me.

This species somewhat resembles *atra*, Lea, in the shape of the elytral depression and the legs, but differs in the clothing, sculpture of pronotum, and the striæ being continuous to apex of elytra. *Striatella*, Westw., is described as having "minute setigerous punctures" on pronotum, a description that would hardly fit the present species, and the epaulettes and sculpture of under surface are not as in Westwood's figure.

Chlamydopsis sculptus, n. sp.

Chestnut-brown, in parts infuscated. Head immersed in thorax when at rest; face slightly concave, with fine, close, distinct punctures. Antennæ fairly long; scape narrowed at base, rather suddenly widened from about middle, with punctures as on face: funicle stout, apparently six-jointed, thickened to apex; club rather short and thick. Prothorax strongly transverse, with fine, close punctures: disc gently convex, front margin well elevated in a sinuous line, a little wider than head, then slightly more elevated, at an acute angle to sides; lateral margins almost parallel, and feebly elevated. Elytra slightly wider than long, a little wider than thorax, with a large sub-basal depression; opening out on the upper edge of the epipleuræ, the striæ of which are directed towards it; ends of depression with a golden fascicle; a feeble, transverse, elevated ridge on each side of scutellum closely punctured; each shoulder raised, with a few large punctures, and an impressed line running from angle of thorax to lateral extension of depression, and separating it from rest of elytra, between this line and depression, a raised process ending in a sharp tooth overhanging lateral extension of depression, and almost meeting a similar process on the other side; on their inner edges a dark, pubescent membrane; elytra beyond scutellar region with some punctures, then with rather fine confluent striolæ not quite reaching apex, and numerous golden setæ. Under surface finely shagreened, and with sparse, fine punctures; an impressed line on metasternum. Legs long; tibiæ strongly inflated, the inflated parts acutely angular. Length, 2 to 2.88 mm.

Hab., Victoria: Sea Lake (J. C. Goudie), Bendigo (J. E. Dixon and C. Oke), Macedon (C. Oke), Daylesford (F. E. Wilson),

Ballarat (W. Du Boulay). South Australia: Mount Lofty (F. E. Wilson), in nests of Iridomyrmex.

This species has passed as *epipleuralis*, Lea, but the puncturation of the prothorax, &c., is certainly distinct, and the front angles of that segment, when viewed directly from above, are more acutely cut off.

Numerous specimens were obtained at Bendigo, and were all of a very pale colour when alive, though they have darkened since mounted, and were of a uniform size —2 mm. Specimens from other parts were all darker, and varied considerably in size.

Orectoscelis bifovæcollis, n. sp.

Light castaneous, abdomen darker, legs and antennæ almost flavous, subnitid; clothed with minute pale setæ, nowhere thick, but closest around scutellar region. Head immersed in thorax when at rest; face with large shallow punctures. Antennæ rather short and thick; scape narrow at base, somewhat suddenly inflated near middle, with punctures as on face; funicle apparently six-jointed, first joint long and thick, second short and thin, then gradually thickening to apex; club short and thick. Prothorax slightly wider (at base) than length down centre, much narrowed to apex; convex, with rather large punctures, becoming strigose at sides; front margin bisinuate across head, then strongly elevated, at an oblique angle, to sides, where it is suddenly cut off; outside this the lateral margin is raised and reflexed to about basal third, where there is a fairly large, deep fovæ. Elytra subquadrate, with a transverse sub-basal depression, opening above, and on, the epipleuræ; the striæ of the latter in convex curves, the opening filled with a bright golden fascicle; in excavation smooth, beyond with feeble, indistinct aurolets, becoming more defined at sides. Pygidium with rather large, feeble aurolets. Under surface shagreened, with a few faint punctures on anterior half of metasternum, which has a faintly-impressed line down its posterior half. Legs moderately long; all the tibiæ distinctly flanged, the flanges increasing in width from apex to near base, and then more or less obliquely cut off; the flanges deeply grooved for the reception of the tarsi. Length, 1.85 mm.

Hab., Victoria: Natya (C. Oke), near nests of *Euponera lutea* and a small black Iridomyrmex, under log. Type unique.

The fovæ on the pronotum is a distinctive character of this species, no species being described as having them. They are round, and impressed obliquely into the pronotum, with the opening directed forward. When fresh there appeared to be traces of a small pubescent membrane within the fovæ, but this is not discernible now.

I refer this species with some slight doubt to Orectoscelis, but, as the prosternum is not distinctly keeled as in other species, and the mesosternum not bisinuate anteriorly merely a narrow segment, as figured by Westwood for his *duboulai*—it seems better placed here than in Chlamydopsis. The base of the pronotum in *bifoveacollis* is as in *O. humeralis*, Lewis, though the sides of depression and legs are similar to *duboulai*, the legs being slightly more angular.

* *Ectatommiphila opaca*, Lea.

Described from New South Wales, and has been taken in Queensland; it is now recorded frm Victoria—Geelong district (H. W. Davey), You Yangs (C. Oke). Victorian specimens are slightly larger, and with the pubescent membranes more distinct than in specimens from New South Wales. In nests of *Chalcoponera metallica*, Sm.

Ectatommiphila glabra, Lea.

Two specimens of this species are recorded—one, the type, from the Blue Mountains, in New South Wales: the other from Mount Tambourine, in Queensland. I have a specimen from Beconsfield which I took off a stump, where it had evidently just alighted, as the wings were protruding around elytra, which is almost certainly this species. Not being too confident that my beetle really was this species, I submitted it to Mr. A. M. Lea, who very kindly sent the following notes:—"Ectatommiphila.—Seems var., or possibly other sex, of *glabra*, of which I have but the type; differs in being about one-fourth larger, and with a golden, transverse, split membrane on each side of elytra in the sub-basal depression. . . On the type of *glabra* the split membranes are much less conspicuous and not at all golden; the punctures, general shape, hind parts, and legs are absolutely the same." A second specimen of this species was taken from a pool of water at Lakes' Entrance by Dr. F. Burnet. Length, 5.1 mm.

Pheidoliphila carbo, Lea.

Described from a single specimen taken at Sea Lake by Mr. J. C. Goudie. Still unique. In nest of Pheidole, sp. ?

Pheidoliphila granulata, Lea.

Described from a single specimen taken in Geelong district by Mr. H. W. Davey. Still unique. In nest of Pheidole, sp. ?.

* *Pheidoliphila pseudocephala*, Lea.

Described from a single specimen taken at Latrobe, Tasmania, by Mr. A. M. Lea, it is now recorded from the mainland for the first time, having been taken in Anglesea district (C. Oke) and Terang (F. Burnet).

I am indebted to Mr. A. M. Lea for confirming my identification of this species.

* *Phcidoliphila minuta,* Lea.

Described from a single specimen taken at Ferntree Gully by the late Mr. F. Spry. It occurs freely in nests of Pheidole, sp. ?, at Ferntree Gully, Belgrave, Emerald, Evelyn, Warburton, and Healesville.

BIONOMICS.

The Chlamydopsini, one of the most interesting groups of beetles in Australia, are all inquilines of ants, though one, *C. comata,* has been found in a termites' nest. Little or nothing is known regarding their relations with their hosts. Judged by the structure of the body and legs, and the complete way in which they "shut up" -that is, the retraction of the head within the thorax and the legs within grooves on the sides of the body -they appear to be of the offensive type of inquiline. On the other hand, the possession by a number of the species of well-developed fascicles of hairs within or on sides of elytral depression, and which are, no doubt, connected with secretory glands, makes one think that perhaps they give off something that the ants are fond of, and so make them welcome guests.

Neither the larvæ or pupæ have been found, so nothing about their breeding is known, and I am not aware of any notes regarding their habits having been published.

On turning over the stone or log covering the nest, the ants will be seen running in all directions, and, with the exception of the species of Iridomyrmex, they gradually quieten down, and practically all retire down the galleries. *Iridomyrmex gracilis* and *I. rufoniger,* however, swarm out and overrun everything around the nests. The ants, as a rule, take no notice of the beetle, whether it is still, moving slowly, or running across the nest —not even if it is among their larvæ and pupæ. The ants, in running around, often collide with the beetle; generally they run around or pass over it without taking any notice. Occasionally an ant will pause and give the beetle a rather close scrutiny, and then move on. On two occasions, at Bendigo, I have seen the little Iridomyrmex pick up *C. sculptus* and carry them off, and hide them behind little stones in the galleries; and three times I have seen the Notoncus pick up *C. setipennis* and run off into the galleries with them. The ant in each case caught hold of the beetles by inserting their mandibles into the lateral opening of the elytral depression. This may have been by accident, but was probably not. After dropping the beetles, all five ants spent some time cleaning (?) their mouths with front legs and antennæ. Unfortunately, it was impossible to say, from their expressions, whether they

were pleased or disgusted. I have several times seen the Pheidole that *P. minuta* lives with pick them up and run away with them, but have not been able to definitely see how they were picked up; but the beetle is held half sideways, and I think it is held by the cleft shoulder.

The beetles behave variously; thus, *C. pygidialis* may be found either sitting or running about in the galleries, around edges of the nest, among the *débris*, or, where the nest is vaulted, on sides or top of vault, or even on the covering stone, and this applies, apparently, to all the species. Generally they are found "shut up" in the nest, but in a few minutes they will start and make a run for one of the entrances to the underground nest, though once I watched *pygidialis* for an hour, and *longipes* for over half an hour, without any apparent movement. When alarmed they all "shut up" tightly and retract their legs into the grooves on their bodies; but if *longipes* be tickled lightly, with finger or bit of grass, they put their long hind legs up in the air at an angle of about forty-five degrees. As they are the only species that do this, and also the only one (so far described) that have an apical spur on the hind tibiæ, I have thought that perhaps they secure a hold on the covering stone to resist the ants from dragging them along. If their structure is really to withstand attacks from the ants, it seems strange that the largest and strongest species of the typical genus, Chlamydopsis, known to me cohabits with the frailest ant that acts as host.

The only times I have known a beetle to eat anything was when I opened a nest of *Iridomyrmex gracilis* at Upwey and found *striatipennis* with a larva in its mandibles. I kept this specimen alive in a box with several well-fed larvæ, and one of the latter disappeared on the second day.

Apparently they cannot smell when they are tightly shut up, for if you blow smoke on them then they make no sign whatever: but if they are resting, as they very often do, with just the tip of the antennæ showing, and you blow smoke on them, they immediately become agitated. This may demonstrate that the olfactory nerves are situated in the antennæ, or it may be that it allows the smell to percolate down to some other part of the body; but I consider the former the more likely.

The only species I have known to fly is *strigicollis*. I was trying the effect of smoke on one of these when, to my surprise, it suddenly and very quickly spread its wings and flew a few inches in the air, when I knocked it down again. The only specimen of *E. glabra* I have taken was from a stump, where it had apparently just landed, as it had its wings protruding from beneath the elytra.

BOOK NOTICE.

FOREST INSECTS OF AUSTRALIA. By Walter W. Froggatt, F.L.S., Government Entomologist of New South Wales. 170 pp. (8 x 4½ inches). With two coloured plates, 44 full plates, and 33 text blocks. Sydney: A. J. Kent, Government Printer, N.S.W. 7s. 6d.

In this useful volume the author has brought together all the available information regarding insects destructive to the forest trees of Australia, much from his own work, "Australian Insects," and from articles contributed by him from time to time to the *Agricultural Gazette* of New South Wales. The subject is treated in sections, dealing with Plant Galls (in which the value of birds as insect destroyers is well emphasized), White Ants (Termites), and Wood-boring Beetles. Then the enemies of various forest trees and allied species are each given a chapter, such as "Insects of the Sugar Gum," "Insects of the Wattles," "Insects of the Red Cedar," or "Insects of the Banksias." By this means it is made easy to trace the insect doing any particular damage. One of the coloured plates illustrates a group of wood-boring moths—that is, the larvæ are wood-borers—belonging to the genus Charaga, known generally by their green-coloured wings and rather long bodies. The other illustrates the lerp scales found on eucalypts: these, by the way, make beautiful objects for the microscope. A large number of plates are devoted to life-histories, while the text blocks in many cases represent the insects greatly enlarged, thus rendering identification easier. The work is one which should be in the hands of every entomologist, who will find in it much to interest him, and in some cases gaps in life-histories which will give him useful occupation while pursuing his favourite study.

THE SILVERY WATTLE-MOTHS.—Perhaps the most beautiful of the smaller moths of Australia are those belonging to the genus Thalaina, of the family Geometridæ, the latter name being derived from the fact that the caterpillars, known as "loopers," seem to measure their stride when moving about their food-plant. There are only five species of the genus found in Australia, and all may be found within a radius of fifty miles of Melbourne. From their handsome appearance—that of burnished silver, with brown markings—they are popularly known as the "Silvery Wattle-Moths," the latter part of the name arising from the fact that the larvæ of all are found on some species of Acacia (Wattle) or another. The most frequently met with species is *Thalaina clara*, the food-

plants of which are the Black Wattles, *Acacia decurrens* and *Acacia mollissima*. The forewings of perfect insects are silver, with dull red markings, which resemble the letter W; hindwings silver, with a dull brown spot near the hind margin. The food-plant of *Thalaina angulosa* is the Golden Wattle, *Acacia pycnantha*, the forewings of perfect insect being silver, with broad dull red markings that resemble the letter W; hindwings silver, with a long dark brown patch across the hind margin. *Thalaina punctilinea*.—The food-plant of this species is the Blackwood, *Acacia melanoxylon*, forewings of perfect insect being silver, with a small dull red line along the base; hindwings silver; under side of the wings have a blotch half dull red and dark brown, which shows through the wing near the hind margin. *Thalaina inscripta*. -The food-plant of this species is the Silver Wattle, *Acacia dealbata*, forewings of perfect insect being silver, with brown markings; hindwings silver, with a dark brown spot near the hind margin. *Thalaina selena*.—The specimen exhibited at the October meeting was captured at Ferntree Gully by Mr. C. Oke, and it is very likely that the larvæ will be found on the Silver Wattle, *Acacia dealbata*, or the Blackwood, *Acacia melanoxylon*, forewings of perfect insect being silver, with dull red markings. The markings resemble the letter V. Hindwing silver; under side of the wing has a blotch half dull red and dark brown, which shows through the wing near the hind margin. There is only one brood in a season of these beautiful moths. The larvæ are full grown by the end of September. When full grown the larvæ make for the base of the tree, where they burrow a couple of inches into loose soil, and under dead leaves near the foot of the tree. If there is a patch of dust at the base of the tree caused by the boring beetle or wood moth larvæ, the Silvery Wattle-Moth caterpillars like to burrow into this dust and commence to spin a small, round, silken cocoon. The outside structure of these cocoons is strengthened with the material into which the caterpillars burrow. The majority of Silvery Wattle-Moth larvæ have pupated by the middle of October. The perfect insects are on the wing in the following March, April, and May, April being the month in which the greatest numbers are found on the wing.—L. Thorn.

Beetles in Pepper.—The small tin of cayenne pepper exhibited to-night was, some time back, discovered to contain larvæ of a beetle; these were allowed to remain in possession of the pepper until they were fully grown, when pupation took place. The perfect insects, recently emerged, are a common little Ptinid beetle, *Ptinus exulans*, Erich. (Carded specimens of beetle exhibited.)—H. W. Davey, F.E.S. 12th Nov., 1923.

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The Victorian Naturalist:

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— OF —

The Field Naturalists' Club of Victoria.

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The Author of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 14th JANUARY, 1924.

1. Correspondence and Reports.

2. Election of Members.

As Ordinary Members—	Proposer.	Seconder.
Dr. W. Heber Green, University, Carlton.	Mr. F. G. A. Barnard.	Dr. C. S. Sutton.
Dr. W. M'Rae Russell, 658 Nicholson-street, North Fitzroy.	Dr. C. S. Sutton.	Mr. F. G. A. Barnard.
Mr. J. Strong, 47 Elizabeth-street, Elsternwick.	Mr. J. A. Kershaw.	Mr. F. Chapman, A.L.S.

3. Nominations for Membership.

4. General Business.

   Nomination for Office of Librarian.

5. Remarks by Exhibitors relative to their Specimens.

   Ten minutes' adjournment for discussion of Exhibits.

6. Reading of Papers and Discussion thereon.

   1. By Mr. E. E. Pescott, F.L.S.—"Notes on Victorian Orchids.—No. 2."
   2. Holiday Experiences by Members.

   The committee will be pleased to receive promises of papers for future meetings.

7. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

   Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and *Naturalist*. Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Club year ended on 30th April last. Any subscriptions overdue should be forwarded to the Hon. Treasurer *at once*.

Subscriptions for 1923–4 are due, and should be paid to the Hon. Treasurer as early as possible.

The Hon. Treasurer requests that members who received tickets for sale for Wild-flower Exhibition will settle for them as early as possible, so that the accounts may be closed.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 10th December, 1923.

The president, Mr. C. Daley, B.A., F.L.S., occupied the chair, and about sixty members and visitors were present.

REPORTS.

A report of the excursion to Belgrave on Saturday, 17th November, was given by the leader, Mr. E. E. Pescott, F.L.S., who said that quite a number of members had taken part in the excursion. Leaving town by the early train, the forenoon had been spent in the neighbourhood of the Sherbrooke Falls, where the fern vegetation is very fine. The differences between the different species were pointed out, and an instructive hour or so spent, notwithstanding the discomfort of some heavy showers. A return was made to Belgrave to meet the afternoon train, by which several members journeyed up, when a visit was paid to the fine garden and fern gully of Mr. J. H. Maddock. Here were seen a good variety of native shrubs, &c., representing several States. They are set out in the grass on the hillside with just a small space cleared around them, and are thriving well. In the garden was a fine plant of the rare *Lilium giganteum*, of China and Japan. When in flower the stem is about ten feet in height and crowded with handsome blooms. The fern gully was in splendid order and contained a large variety of ferns, many exotic species growing alongside its original occupants. Here was seen a fine specimen of the Tasmanian Leatherwood, *Eucryphia Billardieri*, Spach. (Fam. Saxifragaceæ). This tree is about ten feet in height, and is the finest specimen known in cultivation. The members were most hospitably entertained by Mr. and Mrs. Maddock at luncheon and afternoon tea, and the outing was greatly enjoyed.

On the motion of Messrs. E. E. Pescott, F.L.S., and Mr. C. Lambert, a vote of thanks was carried to Mr. and Mrs. Maddock for their hospitality on the occasion of the excursion to Belgrave on Saturday, 17th November.

A report of the excursion to Diamond Creek on Saturday, 24th November, was forwarded by the leader, Mr. C. French, jun., Government Entomologist. There was a good attendance of members, and the afternoon was spent principally in the search for scale insects and kindred pests. A number of trees of the Red Box, *Eucalyptus polyanthemos*, Sch., were examined, and on the foliage and twigs were found a number

of remarkable gall-making scales, among which were *Apiomorpha conica*, *A. ovicola*, and *A. munita*. An Apiomorpha collected will probably prove to be new to science. At least a dozen species belonging to the genera Lecanium, Aspidiotus, and Dactylopius were also collected. The afternoon proved very enjoyable, the excursionists being greatly interested in this usually despised branch of entomology.

A report of the excursion to Black Rock on Saturday, 1st December, was, in the absence of the leader, Mr. J. Shephard, given by Mr. C. Daley, who said that a large party of members attended, and that an interesting afternoon was spent in examining the inhabitants of the numerous shallow pools along the shore.

ELECTION OF MEMBERS.

On a ballot being taken, Miss J. Galbraith, "Dunedin," Tyers, *via* Traralgon, was elected a country member, and Mr. H. M'Coll, 97 Walpole-street, Kew, an ordinary member of the Club.

GENERAL BUSINESS.

The president said that the committee, in accordance with the resolution passed at the October Club meeting, that members of the Plant Names Committee should be presented with mementoes of their work, had had interleaved copies of the "Census of Victorian Plants" specially bound in leather, with an appreciation of the recipients' services inserted. The members of the committee were:—Prof. A. J. Ewart, Dr. C. S. Sutton, Messrs. J. W. Audas, F.L.S., W. R. A. Baker, F. G. A. Barnard, C. Daley, F.L.S., A. D. Hardy, P. F. Morris, F. Pitcher, E. E. Pescott, F.L.S., P. R. H. St. John, and H. B. Williamson, F.L.S. He asked those members present to come forward and receive their mementoes. Dr. Sutton, Messrs. Pitcher, Barnard, Pescott, and Williamson expressed their thanks for the thoughtful action of the Club, both on their own behalf and on behalf of their absent colleagues.

PAPER READ.

By Mr. J. Searle, entitled "The Microscope, and What It Reveals."

This took the form of an illustrated lecturette, in which the author pointed out the many ways in which the microscope, besides being a source of entertainment to the casual observer, had proved itself to be indispensable in scientific investigations of all kinds as well as in modern business and factory working. He illustrated his remarks with a great variety of lantern slides depicting various branches of microscopy.

The chairman, Messrs. Barrett, Williamson, Thorn and Coghill joined in expressing the thanks of the meeting to Mr.

Searle for the very instructive and interesting evening he had provided.

EXHIBITS.

By Mr. F. G. A. Barnard.—A rare fungus, probably *Geoglossum australe* (Ascomycetes), Berk., found growing on beech trees, from head of Don River, Healesville.

By Mr. C. Barrett. -Shells of *Spekia zonata, Nassobsis natta, Neothanma tanganyicense,* collected by Dr. G. D. Hale Carpenter, Uganda Medical Service, at Lake Tanganyika, Central Africa.

By Mr. J. E. Dixon. -Thirty-two species of Victorian Coleoptera, including: -Three species of Buprestidæ, probably new species; also *Stigmodera atricollis,* Saund., *S. moribunda,* Saund., *S. elongatula,* Macl., Neocuris, sp., from Lake Hattah district; Aphanisticus, sp. (rare), and a rare Elater, from Warburton district; Belus, sp. (?), allied to *B. regalis,* Blackb.; *Melobasis iguipicta,* Kerr, from Baxter district; *Stigmodera cyanicollis,* Boisd., and four varieties from Frankston; *Orodes humeralis,* and *Hypocisseis ornata,* Cart., recently described from South Australia, from Wattle Glen (Balee) district—a Victorian record.

By Geological Survey of Victoria, per A. E. Rodda. -Agates from Beechworth district.

By Mr. C. Oke. -Hairy Cicada, *Telligarcta crinita,* from Belgrave district, 6/5/1923.

By Mr. E. E. Pescott, F.L.S. —Growing plant of the West Australian Pitcher Plant, *Cephalotus follicularis,* Labill., with pitchers well developed and large; flowers of the Coolgardie White Gum, *Eucalyptus torquata,* Turc., from a four years old plant, now flowering for the second time; two aboriginal stone axes from Western District; unusual aboriginal stone, hammer-shaped, with groove round centre, similar to stone hammers used by early Siberian natives, and, for comparison, a small stone hand-hammer, ungrooved.

By Mr. J. Searle.—Slides, under microscopes, in illustration of his lecture: —embryo of chick, human embryo, group of diatoms, group of Foraminifera, group of Radiolaria, young colony of Crystatella.

By Mr. L. Thorn. -The head and saw of three Hobson's Bay Saw-fish, *Pristiophorus nudipennis,* caught at Edithvale; also the saw of the large Saw-fish, genus Pristis.

After the usual conversazione the meeting terminated.

EXCURSION TO BEACONSFIELD.

THOUGH Tuesday, 6th November (Cup Day), had been looked forward to by several excursionists, the attendance was very small, probably owing to the curtailment of the railway services

on account of the police strike. On detraining at our destination we met two other entomologists, and joined forces with them. Being all entomologically inclined, the best part of the day was spent in chasing "the elusive bug," but, owing to the long spell of cold weather preceding the holiday, insect life was scarce. The Leptospermum was in full flower, but sterile from a collecting point of view. A nice Clerid of the genus Trogodendron was shaken from an Acacia, and two specimens of a rare Chlamydopsis were secured from nests of Ectatomma ants. Bird-life was exceptionally prolific, some forty-two species being met with during the day. Bell Miners were extremely numerous along the Cardinia Creek, and three nests containing eggs were seen. One clutch was accompanied by an egg of the Pallid Cuckoo—a very rare combination. Other birds found nesting were the Red-browed Finch, Spotted Pardalote, Magpie-Lark, Kookaburra, and Blue Wren. Whilst having lunch we were charmed by the antics of a beautiful male Mistletoe-bird, which stayed around our camp for a considerable time. Other interesting birds noted were the Gang Gang Cockatoo, Leaden Flycatcher, Azure Kingfisher, and Orange-shafted Fantail. Lepidoptera were scarce, but a few fine larvæ were secured for breeding purposes.—F. E. Wilson.

EXCURSION TO BRISBANE RANGES.

In the absence of Dr. Sutton, who unfortunately missed the train, I undertook the leadership of the small party who journeyed to the Brisbane Ranges on Saturday, 10th November. As the party was not large, the Rev. A. C. F. Gates, M.A., who met the first train to Bacchus Marsh, was able to accommodate all and drive them to the ranges, a distance of about twelve miles. The road taken was that running south to Balliang from the railway viaduct near Rowsley. About ten miles out a lane was traversed which enabled us to leave the car a few hundred yards from the hills. On the rocky hillside were found specimens of *Pterostylis pusilla*, Rogers, and an interesting patch of vegetation was met with right on the saddle. Bushes of *Bossiæa microphylla*, in fruit, were abundant, and *Pultenæa Gunnii*, past its prime. *Grevillea aquifolium*, *Acacia Mitchellii*, and *Veronica perfoliata* occurred sparingly, the Acacia being in bud. On this ridge many plants of a rare Daisy-bush, *Olearia* (*Aster*) *iodochroa*, F. v. M., were gathered in bloom, a sprig of which had been sent to me a week previously by Mr. Gates from Staughton Vale. This plant has been recorded for Victoria only from Genoa (Eastern Gippsland) and the Fainting Range by Mueller about 60 years ago, and apparently

has not been gathered since. Its leaves are somewhat like those of *O. pimeleoides*, and thus it may have been placed under that name by collectors. It may be distinguished by its violet disc florets—a feature found in only one other Victorian Daisy-bush, *O. asterotricha*—the violet-coloured edges to the involucral bracts, the pale violet, silky achenes, and the very short bristlets accompanying the pappus. The white limbs of the ray florets also show a tendency to pale violet. "Violet Aster" is rather a misleading vernacular, for that colour is not conspicuous. Another novelty collected was a small plant of the family Epacridaceæ, the position of which is not yet determined. Traversing a steep-sided gully with an almost dry creek-bed, the following species, among others, were gathered: *Brachycome multifida, B. diversifolia*, and *Stellaria pungens*. The ferns gathered were:—*Asplenium flabellifolium, Adiantum æthiopicum, Pleurosorus* (*Grammitis*) *rutifolius*, and *Cheilanthes tenuifolia*, the last-named being in great abundance, and very tall. The luxuriance of *Rumex Brownii* was also remarked. Patches of the pretty introduced Toadflax (Pelisser's), *Linaria Pelisseriana*, were noted. Small plants were not neglected, and among these were *Levenhookia dubia, Brizula gracilis, Mitrasacme paradoxa, Calandrinia calyptrata, Rutidosis pumilo*, and *Stuartiana Muelleri*. The eucalypts seen were *E. dives, E. macrorrhyncha, E. ovata*, and *E. viminalis*. Birds were not plentiful, the most interesting being the White-shafted Fantail and the Rufous-breasted Whistler, the latter much in evidence as regards musical display. Mr. Gates, whose knowledge of the flowers was of much assistance, and whose eye is keen for novelties, drove the party to the railway, where they entrained for home.—H. B. Williamson.

An Orchid Note.—Among the orchids exhibited by me at the recent exhibition of wild-flowers was a Calochilus of unusual form. It came from the Rushworth district along with other flowers. Five specimens came to hand, in none of which was the labellum fringed or bearded, as is usual in this genus. Had there been only one or two such flowers I would have regarded them as abnormal, but the number found, and the fact that in every flower on each spike the unusual formation was evident points to the possibility of an unrecorded species. A sixth specimen had formed its seed-vessel, which might indicate that it finishes flowering just as *Calochilus Robertsoni* commences its season. An endeavour will be made next season to trace this stranger and see if its characteristics are constant. —E. Coleman.

SPIDERS.

By S. BUTLER.

(Communicated by J. Searle.)

(*Read before the Field Naturalists' Club of Victoria, 13th Aug.*, 1923.)

IN introducing the spiders to your notice I would like to emphasize the fact that they are exceedingly interesting subjects for study, though the average person shuns and fears them, as there is a widespread belief that spiders are dangerously venomous. It is true that they can bite and inject venom into the wounds made by their fangs, but, with the exception of certain large spiders that are found in the tropics, the bite would not affect a healthy person any more than would the sting of a bee.

The fact that spiders show a higher development than any other invertebrate animal, their abundance, the many variations in the habits of the different species, and the highly-developed instinctive powers of many of them, render them eminently suitable for the purpose of a congenial study. Spiders can be found almost everywhere. When searching for them do not neglect to turn over stones, old rubbish, leaves, etc., and to look under the loose bark of trees, as these are favourite hiding-places. The trap-door and burrowing species will have to be dug out of the ground. Spiders are easily caught by placing a wide-mouthed bottle over them, if this is then inverted over a similar bottle containing 50 per cent. methylated spirit, the spider will drop into the latter, which will kill and preserve it.

In the scheme of classification spiders are placed in a group of the Arthropoda called Arachnida, between the Crustacea and the Hexapoda, or insects. The Arachnida has two sub-classes; the first is composed of the orders Xiphosura, the King Crabs, and Eurypterida, a fossil group. In sub-class two we have the following eight orders:—

Microthelyphonida.—These are minute arachnids of a translucent white colour; the abdomen is segmented, and they possess a long-jointed flagellum, carried scorpion-like above the back. They have no eyes. This is one of the least known of the Arachnids. The body and tail measure only one-twelfth of an inch in length.

Pedipalpida.—The Whip Scorpions and their allies. The most noticeable feature is the first pair of legs. They are of great length, and are used as feelers.

Scorpionida.—These are well-known animals, although it is surprising how many people call small centipedes, and other such-like animals, scorpions. The noticeable

features are the enormous pincer-clawed pedipalp and the long tail ending in a sting.

Solpugida.—This group is sometimes called Galeodes. They are large, hairy creatures, native to the hot regions, and superficially resembling spiders. They differ from spiders in many ways, in the obvious segmentation of the body suggesting insects, the pincer-like chelicera and the absence of spinning organs and lung-books.

Araneida.—These are the spiders, and will be dealt with in detail later on.

Pseudoscorpionida.—The false scorpions. They resemble a small, tailless scorpion, but are quite distinct from them.

Phalangida.—These are invariably mistaken for spiders. The distinguishing feature is that the abdomen is united to the cephalothorax by its whole breadth.

Acarina.—The Mites. The water-mites, cheese-mites, and cattle-ticks come under this group.

These eight orders belong to the Arachnida. The first and fourth orders have not been recorded in Australia, and possibly will not be unless introduced. There are two small groups that appear to belong here, and they are appended to this group, but their connection is, at its best, a remote one. They are the Tardigrades and Pentastomidæ. The Pycnogonida or Sea Spiders, although they resemble spiders, are quite a distinct group of the Arthropoda.

THE ARANEIDA, OR SPIDERS.

Briefly, their life-history is:—The eggs are laid and enclosed in a silken egg-sac. Some hundreds may be deposited, which in due time hatch out as spiderlings. Some of these keep to the cocoon and web of the parent, others disperse. The Wolf Spiders, which do not spin webs, carry the egg-sac about until the young are hatched, when they cling in a group on their parent's back. Whilst growing they moult quite a number of times, and at the last moult the sexual organs appear. Their food mainly consists of insects, but large tropical species, it is said, catch and eat small birds. They only suck the juices of their victims. They capture their prey by pouncing on them or by snaring them in their webs, and kill them by an injection of venom.

The silk of spiders is used for making egg-sacs, drag lines, swathing bands to envelop their prey with, and in making the viscid thread and the hackled bands for snaring. The webs are of numerous shapes—the irregular, spun by the Theridiidæ; sheet webs, funnel-shaped, and the geometrical, spun by the garden spiders. The detail of building a web is wonderful, especially the geometrical type.

External Anatomy.—The first point noticed is the division, or the "waist," of the body. The front portion of the animal is the head and thorax, fused together; this is called the cephalothorax. The rear division is the abdomen. Examining the cephalothorax, you will notice the eyes, which vary from two to eight in number. This portion of the head is known as the "ocular area." The space between the eyes and the jaws is called the clypeus. On the thorax there are lines or depressions called the striæ. The under portion of the cephalothorax is protected by the sternum, a plate of variable shape usually notched at either side for the reception of the legs, and having in front a small plate hinged to it, known as the labium.

The Cheliceræ.—These are commonly called the jaws, each jaw consisting of two parts—the base and the fang. The fang is hook-like; it bears the orifice of a poison gland, and can generally be folded back into a groove upon the base.

The Mouth.—A spider does not imbibe the juices of its prey through the jaws. If a spider is placed on its back and the labium is raised, whilst the chelicera are pushed forward, no orifice is visible, but on careful examination the labium can be separated from the rostrum, and the orifice is then disclosed.

The Pedipalps are extremely leg-like feelers, and are six-jointed. In the female the pedipalp terminates with a single claw, whilst in the male, after the last moult, the pedipalp is seen to have developed a remarkable copulatory apparatus. The "endites" or maxillæ are the thickened portions at the base of the pedipalp.

The Legs are eight in number. This feature is one of the main characteristics of the Arachnida. They are seven-jointed, and are more or less thickly coated with hairs. Stouter hairs or bristles are often present, and some of the joints are furnished with spines. The tarsi terminate with either two or three claws, which are dentated. In many spiders of climbing habits there is also a tuft of club-like hairs, known as the "scopula." In the Cribellate spiders the metatarsus of the hind leg is furnished with a comb-like organ the "calamistrum."

The Abdomen. The abdomen varies remarkably in shape. It is marked with a great variety of colourings and patterns, some of which are wonderfully beautiful. Beneath the abdomen can be seen the orifices of the breathing and genital organs, also the spinnerets.

The Spinnerets are situated at the posterior end of the abdomen. They are normally six in number, and are arranged in various positions. The spinnerets are highly mobile appendages. They are the movable turrets on which are

mounted the projections, where the tubes from the spinning glands open. In addition to the six spinnerets, there is to be found in the Cribellate spiders the "cribellum." It is in the form of a double sieve-like plate, through which the liquefied silk passes. This is always correlated with a carding comb of curved bristles, situated on the metatarsus of the hind leg.

The breathing organs are placed well forward near the waist, on the under side of the abdomen, and are visible from the exterior as two pale, semi-circular-shaped spots, with the base of each opening on the sides of the "epigynum." The epigynum is the covering of the genital organ. The variation of its structure is an aid in determining the species.

The tracheal spiracles are present, but are only visible to the naked eye in the six-eyed spiders.

Internal Anatomy.—Alimentary System. The mouth opens into the pharynx, continuing upwards and backwards as a narrow tube (the œsophagus), and passes right through the brain or nerve mass to the sucking stomach. This canal so far is lined with chitin. The sucking stomach is the food pump, and is actuated by strong muscles. Shortly behind the sucking stomach the mid-intestine sends, on either side, a large branch, from which five secondary branches are given off. The food then enters the hind intestine and passes into the rectum.

Vascular System.—The circulation of the blood can be observed in the legs of young spiders. The amœboid corpuscles can be distinguished. The tubular heart is situated in the abdomen; it is a muscular tube, with three pairs of lateral openings, each furnished with simple valves. Numerous arteries leave the heart, conveying the blood to different parts of the body. There are no capillaries, but the blood is delivered into the tissues, and passes into the spaces of the body cavity between the viscera, bathing the various organs. It then finds its way to the base of the abdomen, and on to the "lung-books," where it is purified, and again enters the heart.

Respiratory System.—Spiders have two organs for aerating the blood—namely, the lung-books and tracheæ. The true spiders have one pair of lung-books and trachæa, the trap-door spiders have two pairs, and the genus Nops has tracheæ only. A modification of this is found in *Argyroneta aquatica*, the Diving Spider, which has, in place of the lung-books, simple cavities, at the end of which numerous tracheæ ramify into the tissues.

The cavity containing the lung-book is known as the air vault; it is filled with numerous hollow leaves or envelopes, placed in a horizontal position. The whole lung is comparable to a letter file that has divisions composed of envelopes, the inside of the envelope containing the blood and the outside

projecting into the air cavity. There are eighty-eight of these envelopes in the lung-book of *Clubiona robusta*, a common Victorian spider.

The leaves are really a continuation of the external chitinous cuticle, but the chitin is very much thinner. Viewed in the longitudinal section, the under side is smooth, whilst the upper side is covered with small spines 1/2,000th of an inch in length, which are thickened at the top in the form of a small knob. The spines on the end of the leaf at the air opening branch into one another, making a hedge-like formation, and on the vertical wall of the cavity the same formation is found. Their purpose is to separate the leaves for the free access of air.

Internally the leaves have muscular supports. The muscle contains a nucleus, and is capable of expansion and contraction. Their object is to keep the leaves apart, and probably to circulate the blood or air in the lung. Viewed from above, the leaf is covered with spines, with a connecting thickening line of the membrane at their base, forming a trellis-work pattern. The muscular supports show out in the stained dissection as numerous grouped spots.

In tracing the evolution of the lung-books of the Arachnida, they show a close affinity to the Crustacea. The Crustacea have external gills. The King Crab, that is now definitely placed in the Arachnida, has external gill-books, whilst among the Arachnida we have the highly-specialized lung-book; in *Argyroneta aquatica* just the air vault, with tracheæ at its extremity; and in the genus Nops the lung-book is absent, and only tracheæ similar to the tracheæ of the insects are present.

Nervous System.—The centre of the nervous system is situated in the cephalothorax. It supplies nerves to the eyes and other parts. Regarding the location of some of the organs of sense, very little can be stated at present.

The eyes are sessile and immovable. In structure they are like the ocelli of insects. Externally there is a lens, succeeded by a mass of transparent cells, behind which is a layer of pigment; then come the rods and cones of the retina, to which the optic nerve is distributed. This is a reversal of the position of the retina and the pigment layer, compared with the Vertebrata.

Reproductive Organs.—The internal generative organs are situated in the abdomen, and are of a simple nature in the male. In the female the eggs project from the outer surface of the ovary, like beads, and are connected with this gland by narrow stalks. When ripe these eggs pass through these stalks, finding their way eventually through the genital opening, which is situated between the lung-books.

Poison Glands.—These glands, two in number, are in the cephalothorax, but sometimes partially, or even entirely, in the base of the chelicerae. The wall of the sac has excreting cells of a capillary nature and a thin outer layer of muscular and connective tissue. The fibres of the muscles are arranged in a spiral manner. By a contraction of these walls the contents of the bag can be forced down the narrow duct to the opening near the extremity of the fang.

Spinning Glands.—These are situated on the floor of the abdomen. There are hundreds of them: some are shaped like clusters of berries, whilst others are cylindrical and pear-shaped. Numerous tubes connect them to the spinnerets. Various kinds of silk are manufactured in this silk factory. Silk like the softest of down, to the snaring lines covered with viscid globules, can be spun at the will of the spider. The silk is secreted in a liquid form, and on coming into contact with the air it instantly solidifies into a strand of marvellous strength.

The following is a simple reference key to the families of spiders that have been recorded in Australia. First of all be certain that the creature is a spider. Look for a decided waist and the eight legs. The Phalangida and other orders closely resemble the spiders.

TRAP-DOOR SPIDERS.

Fam. Avicularidæ. Uncommon.

These spiders have four lung-books. They are visible on the under side of the abdomen. The fangs do not meet in a pincer-like fashion, but move in a vertical direction, side by side.

THE TRUE SPIDERS.

The true spiders have only one pair of lung-books, and their fangs meet in a pincer-like fashion.

Fam. Hypochilidæ. Very rare; one species only, recorded from Tasmania.

This curious family has pincer-like jaws, but two pairs of lung-books, and a cribellum and calamistrum are present.

THE HACKLED BAND WEAVERS OR CRIBELLATE SPIDERS.

On the second last joint of the hind legs is a fine comb, called the calamistrum, and in front of the spinning organs is an oval plate, known as the cribellum. The snaring lines of their webs are teased out like a strand of frayed wool.

Fam. Uloboridæ. Fairly common.

The most distinguishing characteristic of this family is the first pair of legs, which are much longer and stronger than the other three pairs, and the longitudinal stria on the cephalothorax is absent. The metatarsus of the hind leg is bowed in shape. They are small spiders. When at rest on their webs their hind legs are doubled up vertically, with their long front legs stretched well forward. Some weave geometrical webs, but the spiral lines are hackled.

Fam. Psechridæ. Rare.

These are the only Australian cribellate spiders that have scopula (thick tufts of hairs between the claws). They have three claws; their legs are fine and long, especially the front ones.

Fam. Dictynidæ. Common.

The cephalothorax is oval, with a median longitudinal stria present. The eyes are in two straight or slightly curved rows, and are of a pearly colour; the laterals are very close together. The most common member of this family is *Amaurobius robustus*, the large black spider found on our outhouses.

Fam. Œcobiidæ. Rare.

The cephalothorax is broader than long, with the eyes grouped nearly in the centre of it.

Fam. Filistatidæ. Rare.

The calamistrum is extremely short—about a quarter the length of the metatarsus.

The above families are all of the cribellate spiders that have been recorded in Australia.

Note that sometimes the males lose the calamistrum, or the cribellum, and in certain cases both, when they are fully matured.

THE PLAIN THREAD WEAVERS OR NON-CRIBELLATE SPIDERS.

The Six-eyed Spiders.

Fam. Sicariidæ. Rare,

Fam. Dysderidæ. Rare.

This family can be distinguished from the preceding one by the coxa of the first two legs being long and cylindrical, also two tracheal spiracles are visible near the openings of the lung-books.

The Eight-eyed Spiders.

Fam. Hadrotarsidæ. Rare.

A very small spider, easily distinguished by the median eyes being of a triangular shape, with three very small eyes each side of them.

Fam. Drassidæ. Very common under stones and bark.

Eyes in two straight rows, two claws; the fore spinnerets are widely separated. The spinnerets are visible from above.

Fam. Clubionidæ. Common.

Similar to the Drassids, only the eyes are more extended and the fore spinnerets are not separated. The Giant Crab Spiders ("Triantelopes") are in this family.

Fam. Thomisidæ. Common.

These are the pretty, small, crab-shaped spiders.

Fam. Argiopidæ. Common.

The garden spiders. They weave geometrical webs; their spinnerets are rosette-shaped.

Fam. Theridiidæ. Fairly common.

Their spinnerets are similar to the Argiopidæ, and these spiders are sometimes difficult to separate from them. On the last joint of the hind legs, near the claws, are a few toothed hairs. *Latrodectus hasseltii*, the so-called poisonous red-striped spider, is in this family.

Fam. Mimetidæ. Rare.

Somewhat like the Theridiidæ and the Argiopidæ, only on the first and second legs, on the tibia and the metatarsus, on the inner side, are small, strong, curved spines, situated between longer ones. Of the curved spines, the upper one is always the smallest, and each succeeding one is longer than its predecessor.

Fam. Pholcidæ. Common.

Legs extremely long and thin. The "Daddy Long Legs" of our houses.

Fam. Hersiliidæ. Rare.

The hind spinnerets are very long—almost half the length of the legs.

Fam. Zodariidæ. Fairly common.

This and the following family resemble the Drassids, only they have three claws. It is difficult to characterize this family, as there is great variety in the genera. The following details will help:—The front spinnerets are long, whilst the others are very short.

Fam. Agelenidæ. Fairly common.

Similar to the Zodariidæ, only the hind spinnerets are longer than the others, and have the terminal joint narrowed towards the end, with the spinning tubes on the inner side.

Hunting Spiders.

Fam. Lycosidæ. Very common.

These are ground spiders. They carry their cocoons about on their wanderings. When the young hatch out they cling to their parent's back. They are easily recognized by four small eyes in an even row in the front, two large on the top of the head, and two smaller ones further back. A small, decided notch is on the outer and underneath margin of the trochanter (this is the second joint of the leg).

Fam. Pisauridæ. Uncommon.

At first sight these appear to be Lycosids, but their eyes are like the Drassids'. The trochanters are notched in a similar manner to the Lycosids'.

Fam. Oxyopidæ. Uncommon.

The trochanters are notched or slightly so. Two very small eyes are in front; two large ones are next, the same distance apart; two smaller ones, widely separated form the third row; and the back row is similar to the second row. They hunt their prey like the Attids.

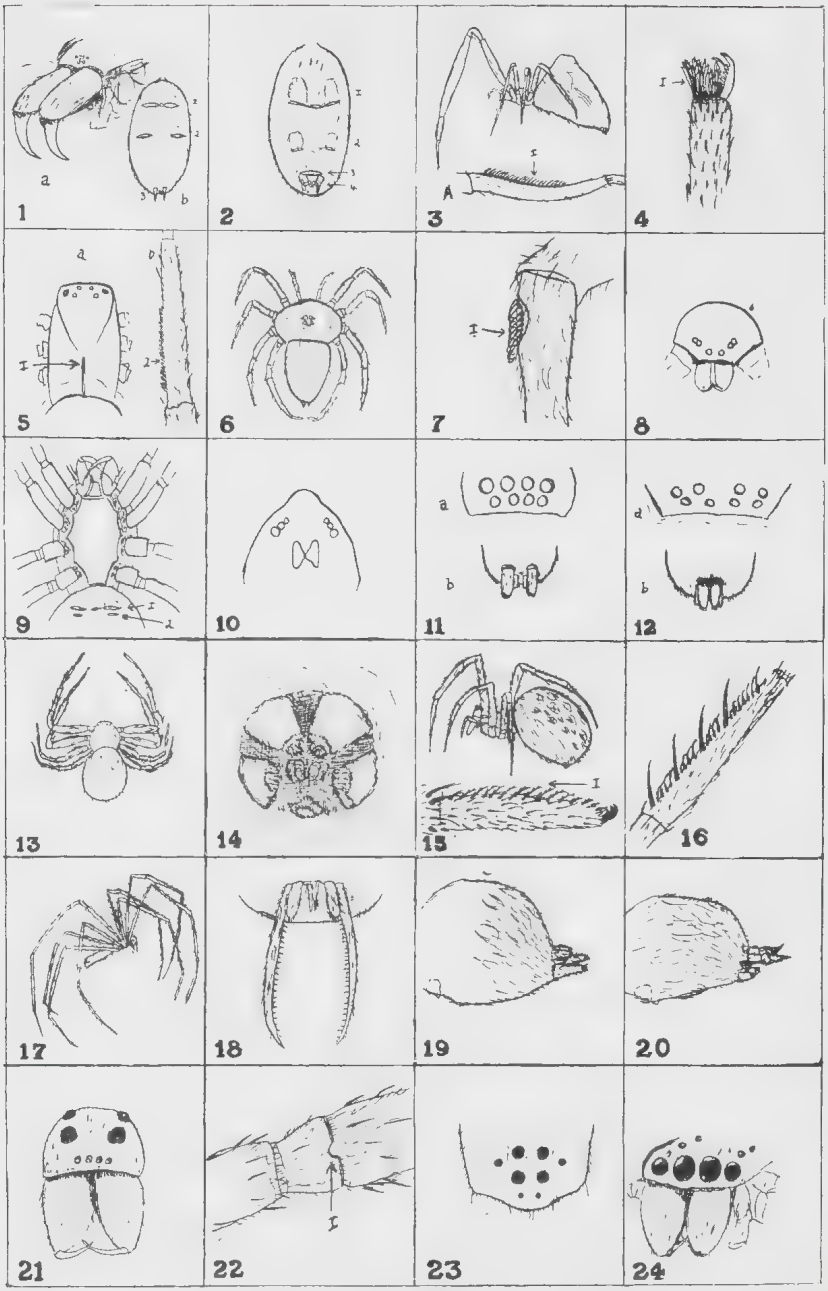
Jumping Spiders.

Fam. Attidæ. Very common.

The jumping spiders are recognized by the four enormous eyes across the front, the other two pairs being further back.

Anyone who wishes to study the spiders will find E. Simons, "Histoire Naturelle des Araignees" the classic on nomenclature. This work is in French and Latin. The more modern classification, by J. H. Comstock, in his "Spider Book," adapted to our Australian species, would be preferable, whilst the detail on anatomy is all that is to be desired. This work is on the American spiders, and in English. "A Catalogue of Australian Spiders," by W. J. Rainbow, is published in the *Records of the Australian Museum*, vol. ix., No. 2, 2nd October, 1911. For illustrations of Australian spiders refer to a German work, "Die Arach. des Australiens," by Kock and Keyserling. All of the above are now in our Melbourne Public Library. Comstock's work of 700 pages is recent, and is still in print; published by Doubleday, Page and Co., New York.

PLATE XIV.



SPIDERS.—PROMINENT FEATURES.

EXPLANATION OF PLATE.

1. Avicullariidæ.—(*a*) Chelicera ; (*b*) under side of abdomen ; (1) first pair of lung books ; (2) second pair ; (3) spinnerettes.
2. Hypochilidæ.—(1) and (2) Lung books ; (3) cribellum ; (4) spinnerettes.
3. Uloboridæ.—(*a*) Metatarsus of hind leg ; (1) calamistrum.
4. Psechridæ.—(1) Scopula of tarsus.
5. Dictynidæ.—(*a*) Cephalothorax : (1) median longitudinal stria ; (*b*) metatarsus of hind leg ; (3) calamistrum.
6. Œcobiidæ.—Notice the position of the eyes.
7. Filistatidæ.—(1) Short calamistrum on hind leg.
8. Sicariidæ.—A six-eyed family.
9. Dysderidæ.—(1) Lung books ; (2) spiracle.
10. Hadrotarsidæ.—Showing position of the eyes.
11. Drassidæ.—(*a*) Eyes ; (*b*) spinnerettes.
12. Clubionidæ.—(*a*) Eyes ; (*b*) spinnerettes.
13. Thomisidæ.—The pretty, small, crab-shaped spiders.
14. Argiopidæ.—Rosette form of spinnerettes (enlarged).
15. Theridiidæ.—(1) Toothed hairs on tarsus of hind leg.
16. Mimetidæ.—Spines on the first and second legs.
17. Pholcidæ.—Notice the long and thin legs.
18. Hersiliidæ.—Observe the very long spinnerettes.
19. Zodariidæ.—Abdomen, showing spinnerettes.
20. Agelenidæ. — Abdomen, showing the jointed hind spinnerettes.
21. Lycosidæ.—"Face," showing the grouping of the eyes.
22. Pisauridæ.—(1) Notch on trochanters.
23. Oxyopidæ.—Cephalothorax, showing eyes.
24. Attidæ.—Notice the four enormous front eyes.

NOTES ON THE COLEOPTERA OF NORTH-WESTERN VICTORIA.

PART X.

BY J. C. GOUDIE.

(*Read before the Field Naturalists' Club of Victoria, 12th Nov.*, 1923.)

CLERIDÆ.

THIS family is represented by a limited number of small but handsome beetles, often metallic in colour, and very pubescent; easily recognized by the short, clubbed antennæ, narrow form, and prominent eyes. They are mostly diurnal and carnivorous in habits, frequenting flowers and foliage in search of other small insects. I am much indebted to Messrs. A. H. Elston and A. M. Lea for the identification of the species enumerated herein. In a recent paper * Mr. Elston has drawn attention to some changes in nomenclature. Thus, Eunatalis for Natalis, Phlogistus for Aulicus, &c. He also states that *Opilo incertus*, Macl., is a synonym of *Tarsostenus univittatus*, Rossi, with this explanation:—"Macleay's name will now have to be added to the several synonyms of this cosmopolitan species."

3451. *Opilo congruus*, Newm.

This is brown, with the base, a band near the middle, and the tips of elytra yellow: the basal half of all the femora also yellow; $\frac{3}{8}$ of an inch long.

3455. *Tarsostenus univittatus*, Rossi (= *Opilo incertus*, Macl.)

A smaller species, nearly black, with a whitish transverse band behind middle of elytra.

3461. *Eunatalis porcata*, Fab.

This beetle is not unlike some longicorns, from which the short, clubbed antennæ at once distinguish it. It measures $\frac{3}{4}$ of an inch, and is reddish-brown to nearly black, without markings. Found under bark.

3464. *Blæsiopthalmus* (*Thanasimus*) *accinctus*, Newm.

This little Clerid has a wide head and large eyes, giving it somewhat the appearance of a small "tiger beetle." It is black, with reddish legs; on the middle of the elytra is a narrow yellow transverse band; behind this is a yellow longitudinal spot, or vitta, on the suture. Taken on tree-trunks.

Phlogistus (*Aulicus*) *dives*, Blackb.

3485. *P. imperialis*, Gorh.

3486. *P. instabilis*, Newm.

P. dives has the head and prothorax greenish-blue; elytra purple, with a yellow band in front of middle; and a red spot

* Tr. Roy. Soc. S. Aust., xlv. (1921).

on each near apex : ¼ of an inch long. *P. imperialis* is metallic purple, the under side blue and green. The elytra are strongly punctate, except the shoulders and apical fourth. In some specimens the upper surface is brilliant green. *P. instabilis* is a similar beetle, and is more often seen. The colour is variable, ranging through all shades of green, blue, and purple.

3501. *Trogodendron fasciculatum*, Schrieb.

One of our largest species, measuring nearly an inch in length. It is black, with yellow antennæ. The elytra are coarsely punctate, with a broad pre-apical band of velvety-black hair, a tuft of the same on the base, and two small yellow spots near outer margin. On a hot day this beetle is very active and restless, reminding one of a wasp. Mr. Froggatt says it is parasitic on the pupæ of some of the large wood-moths.

3512. *Zenithicola funesta*, Chevr.

A smaller species than the last mentioned. Black, with much white pubescence. The scutellum and two spots near apex of each elytron clothed with short white hairs. Rare locally.

Eleale latipennis, Elston, Tr. Roy. Soc. S.A., xlv., 1921, p. 163.

Dark violet, or nearly black. The scutellum and extreme apex of elytra are clothed with short white hairs. It measures ¼ of an inch.

3537. *E. pulchra*, Newm.

A larger beetle (½ an inch), dull purple or violet, with a yellow transverse band on elytra behind the middle ; antennæ yellow.

3562. *Stigmatium ventrale*, Macl.

Somewhat resembles Trogodendron on a small scale. The ventral surface is pale red. It is about ½ an inch in length, and found under bark.

Lemidia australiæ, Lea, Ann. Soc. Ent. Belg., tome li., 1907, p. 346.

3566. *L. bifurcata*, Gorh.

L. meridionalis, Lea, *l. c.*, p. 359.

3589. *L. rufa*, Gorh.

L. villosa, Lea, *l. c.*, p. 357.

The species of Lemidia are handsome little beetles, under ¼ of an inch long. Mr. A. M. Lea, who has described a considerable number of new species, remarks : "The genus Lemidia is one of the most typical of Australian Clerides, and is confined (with the exception of a single species from New Zealand) to Australia and Tasmania."

3603. *Pylus fatuus*, Newm.

A concolorous brown beetle, ½ an inch long, having the sides

of prothorax strongly toothed. Found on tree-trunks under bark, rarely in the Mallee, though it is a common southern species.

3610. *Necrobia rufipes,* De Geer.

An introduced, carrion-feeding beetle. It is about ¼ of an inch in length, and is blue, with red legs.

LYMEXYLONIDÆ.

3613. *Lymexylon australe,* Er.

This is a strange-looking insect. A specimen in my collection (which was taken on the wing, at sunset) measures slightly over an inch, and is dark brown or nearly black. The elytra are very short (¼ of an inch), becoming very narrow (inner margins divergent), roundly pointed at apex. The ample flight-wings are, of course, only partly covered by the elytra. An isolated form. It was described by Erichson in 1842, and seems to have been the only known Australian species until, 57 years later, the Rev. T. Blackburn described another under the name of *L. adelaidæ.*

PTINIDÆ.

An interesting family of small beetles containing some remarkable insects. In most of them the apterous body is oval and strongly convex; the short prothorax partly conceals the head from above. There are several introduced species, commonly found about dwellings, &c. In the Mallee we have five native species, all living as inquilines or guests in the nests of ants.

3622. *Ptinus fur,* Linn.

An introduced species.

3626. *Diphobia familiaris,* Oll.

Shining jet-black.

3631. *Ectrephes kingii,* Westw.

Minute, reddish-castaneous, taken with small black ants.

3634. *Diplocotes foveicollis,* Oll.

Reddish-canstaneous, with a deep fovea in prothorax; under bark, with *Cremastogaster læviceps.*

D. strigicollis, Lea, Proc. Roy. Soc. Vic., xxiii. (new series), part 1, p. 221.

Paussoptinus laticornis, Lea, *l. c.,* xvii., part 2, p. 382, plate xxvii., fig. 7.

This little chestnut-brown beetle combines, in its structure, the characters of two families—viz., Paussidæ and Ptinidæ. As Mr. Lea has pointed out, the head, prothorax, elytra, and abdomen are those of a typical Ptinid, while the antennæ have the broad, flattened form of the Paussidæ, thus forming a very

definite connecting link between the two families. The first specimens were taken at Birchip many years ago by the writer, in a nest of the wood ant, *Iridomyrmex nitidus*. This ant is found in large colonies living in hollow logs and stumps, and is a favourite host with myrmecophilous insects, such as beetles of many kinds, crickets, cockroaches, wasps, larvæ of moths, springtails, &c.

BOSTRICHIDÆ.

This is a small family of wood-boring beetles. They are cylindrical in shape, with the head placed on the under side of the prothorax; antennæ short, clubbed.

3641. *Bostrychopsis jesuita*, Fabr.

The well-known "auger beetle," which bores neat, round holes in the wood of various trees and shrubs, including fruit trees. *Pittosporum phyllyræoides*, a small tree or shrub, known as the "Mallee Willow," is sometimes riddled by this beetle, which is black, with roughly punctate elytra, and measures from ½ to nearly ¾ of an inch in length. The larva is a short, stout, yellowish-white grub.

3643. *Xylion collaris*, Er.
Xylobosca mystica, Blackb. (?)
Xylopsocus bispinosus, Macl.
Xylotellus lindi, Blackb.

The above are small, shining, reddish-brown species, *X. collaris*, the largest, being slightly under a quarter of an inch in length. It is well known as a fruit-tree pest. I once found a Murray Pine badly infested with this species. The smaller species are mostly found breeding in the small branches of various acacias.

DUNK ISLAND.—What Australian naturalist has not heard of Dunk Island, that naturalists' paradise off the coast of Northern Queensland, where the late Mr. E. J. Banfield made his home for many years, and, under the *nom-de-plume* of "The Beachcomber," issued his delightful nature-study books? In the *Australian Museum Magazine* for October (No. 10, the concluding part of the first volume) Mr. Chas. Barrett, C.M.Z.S., has a pleasant article dealing with a visit to the island as the guest of Mr. Banfield, in which he briefly describes the many interesting sights which there met his view. The birds, the butterflies, the reptiles, all come in for a share of his remarks, and one ceases to wonder that the late Mr. Banfield cut himself off from the world, so to speak, for so many years when he had so much to interest him and wonder at on every hand, and, as nothing was molested, the opportunities for unravelling some of the mysteries of nature were many.

Gordius Worm.—The worm exhibited at the November meeting was from Buna Bay, Papua, and may be one of the Gordiidæ of the Nematomorpha, parasitic worms usually found attacking aquatic insects, although some species use land snails as hosts. On page 170 of the "Cambridge Natural History," "Worms, Rotifers and Polyzoa," it states: -"The life-history of Gordius comprise four stages: the early development of the egg, the first larval form, the second larval form, and the sexually mature form. Both larval forms are parasitic, and during their life they are actively engaged in feeding. The free form, on the other hand, takes no nourishment, and is exclusively engaged in reproduction." These parasitic worms in some instances appear to use a secondary host, somewhat similar to that of the sheep-fluke. The larval Gordius that has become parasitic on the aquatic larva of an insect may gain access to a fish that eats the parasitized insect larva, the fish becoming the secondary host; ultimately, however, it leaves this host and makes its way to land. The specimen shown is very close to being six feet long when it is fully extended, and when alive was chiefly remarkable for its extremely slow movement along the ground, looking like a piece of animated thin wire. I have a slightly smaller specimen from the Yodda Valley, Papua.—H. W. Davey, F.E.S.

"The Gum Tree."—The September (1923) issue of *The Gum Tree*, the official organ of the Australian Forest League, which is owned and published by the Victorian branch of the League, contains the report of the committee of the branch for the year ending 30th June. The committee reports that useful work in several directions had been accomplished, though hampered somewhat by want of financial support. An interesting illustrated article by Mr. E. E. Pescott, F.L.S., entitled "The Australian Flora from an Ornamental Aspect," deals with the use of various eucalypts as specimen trees in parks and gardens. The characteristic features of each species is given, with the treatment it should receive under cultivation.

Plywood.—The *Australian Forestry Journal* for October, 1923, contains an interesting article dealing with the production of plywood in various countries. This material is now in every-day use for various purposes, not only as linings in the construction of houses, but even for box-making, such as tea chests, for which it has proved itself stronger than solid wood. An important factor in the preparation of plywood is the glue or adhesive mixture used to cement the sheets together; this may be waterproof or non-waterproof. Into the latter casein, a milk product, is said to enter largely. It is calculated that the use of plywood is the most economical way of using timber for a great variety of purposes.

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The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria.

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The Author of each article is responsible for the facts and opinions recorded.

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1924.

Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 11th FEBRUARY, 1924.

1. Correspondence and Reports.
2. Election of Members.

AS ORDINARY MEMBERS—	PROPOSER.	SECONDER.
Miss E. C. Cameron, 87 Powlett-street, East Melbourne.	Mr. C. Oke.	Mr. F. G. A. Barnard.
Miss E. M. Haynes, "Eckersley," Plant-street, Malvern.	Mr. C. Daley, B.A.	Miss R. S. Chisholm.
Miss I. Morrison, "Baringa," College-parade, Kew.	Mr. F. Keep.	Mr. A. E. Keep.
Mr. Thomas Meldrum, "Persoonia," 380 Northcote-road, Armadale.	Mr. E. Cox.	Mr. C. Daley, B.A.
AS COUNTRY MEMBERS—		
Mr. D. J. Maher, State School, Newry.	Mr. H. B. Williamson, F.L.S.	Mr. C. Daley, B.A.
Mr. John Elliott, Railway Station, Noojee.	Mr. A. G. Brown, LL.B.	Mr. J. H. Harvey.

3. Nominations for Membership.
4. General Business.
5. Remarks by Exhibitors relative to their Specimens.

   Ten minutes' adjournment for discussion of Exhibits.

6. Reading of Papers and Discussion thereon.

   1. By Mr. F. E. Wilson—"Some Glimpses of our Bush Birds." (Illustrated with lantern slides).
   2. By Mr. H. B. Williamson, F.L.S.—"Description of a New Genus of the family Epacridaceæ."

   The committee will be pleased to receive promises of papers for future meetings.

7. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

   Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and *Naturalist*. Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Club year ended on 30th April last. Any subscriptions overdue should be forwarded to the Hon. Treasurer *at once*.

Subscriptions for 1923-4 are due, and should be paid to the Hon. Treasurer as early as possible.

The Hon. Treasurer requests that members who received tickets for sale for Wild-flower Exhibition will settle for them as early as possible, so that the accounts may be closed.

The Victorian Naturalist.

Vol. XL.—No. 10. FEBRUARY 7, 1924. No. 482.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall, Victoria-street, on Monday evening, 14th January, 1924.

The president, Mr. C. Daley, B.A., F.L.S., occupied the chair, and about fifty members and friends were present.

CORRESPONDENCE.

From Mr. H. Hughes, tendering his resignation as librarian of the Club, as he intended visiting England for some months.

It was decided to accept the resignation with regret, and to thank Mr. Hughes for his services.

REPORTS OF EXCURSIONS.

A report of the excursion to Belgrave on Saturday, 15th December, was given by the leader, Mr. C. Oke, who said that, fortunately, he had been the only member to attend the outing. Other members had probably not gone owing to the threatening look of the weather. These threats were carried out, as it rained incessantly from a quarter to 1 till 5.30 p.m. After the rain ceased it was possible to do a little collecting, principally of ants, but the best capture for the day was a very fine female specimen of a rather scarce beetle, *Macrones capita*, Pasc., a pretty dark red and black wasp-like longicorn.

A report of the Christmas excursion to the National Park, Wilson's Promontory, was given by the leader, Mr. C. Daley, B.A., F.L.S., who said that the week's visit had been undertaken by a party of sixteen, including six ladies. The accommodation afforded by the new Chalet had been much appreciated, and, with this base, future visits to the Park would be very much easier to plan. A fair amount of country had been traversed, and a general idea of the nature of the Park gained. Sealers' Cove, on the eastern side, had been visited by a small party, and the rich vegetation on that side of the Promontory seemed to warrant a closer investigation on some future occasion; at any rate, the Myrtle Beech, *Nothofagus Cunninghamii*, was definitely ascertained to grow in that vicinity. The entomologists and ornithologists had noted many species in their respective domains, whilst the photographers had secured many mementoes of their visit. The trip was greatly enjoyed by all who took part in it, though missing the tide at the outset caused some inconvenience and loss of time. Mr. L. Thorn read a list of the birds seen during the trip across Corner Inlet,

and of those seen in the Park, numbering thirty species, none of which were particularly rare.

ELECTION OF MEMBERS.

On a ballot being taken, Dr. W. Heber Green, University, Carlton; Dr. W. M'Rae Russell, 608 Nicholson-street, North Fitzroy; and Mr. J. Strong, 47 Elizabeth-street, Elsternwick, were unanimously elected ordinary members of the Club.

GENERAL BUSINESS.

The chairman asked for nominations for the librarianship, but as no one present was prepared to accept the position the matter was referred to the committee.

PAPER READ.

By Mr. E. E. Pescott, F.L.S., entitled "Notes on Victorian Orchids, No. II."

The author gave an account of the orchids which have been recorded for Victoria since his previous paper published in the *Victorian Naturalist* for January, 1921. Thirteen new species are recorded, of which five species are new to science. The most interesting of the new species being perhaps *Pterostylis recurva*, Rogers, which is found in the Dandenong Ranges. It seems strange that this comparatively large orchid had been so long overlooked, but probably it is that no one looked for a Pterostylis in the middle of summer. One species hitherto regarded as such had been reduced to a variety viz., *Prasophyllum odoratum*, Rogers, var. *album*, Rogers. Two new varieties are recorded, both coming from Alberton. A note is also recorded of a white variety of *Thelymitra epipactoides*, F. v. M. The change of name of two genera is noted. This is due to priority of nomenclature. Thus the genus Corysanthes, of which there are four species in Victoria, has been changed to Corybas. It is also recorded in the Census that the genus Drakæa becomes Spiculosa, there being two species recorded for Victoria.

The paper was illustrated with lantern slides of many of the species mentioned.

HOLIDAY EXPERIENCES.

Mr. H. B. Williamson, F.L.S., with the aid of lantern slides, gave some account of a Christmas trip to Eastern Gippsland and of a visit to Mildura in the September vacation.

A note on the birds of Lardner, West Gippsland, was contributed by Miss C. C. Currie, being birds seen from her verandah during the holidays.

REMARKS ON EXHIBITS.

Mr. J. Searle, with the aid of enlarged drawings, called atten-

tion to exhibit of the life-history of Obelia, a hydroid polyp. This organism has two modes of reproduction, and lives either a free-swimming or a fixed existence.

EXHIBITS.

By Mr. C. Daley.—Grinding stone of dune sandstone, also flint core, with chipped cutting edge, from coastal middens, Wilson's Promontory.

By Geological Survey of Victoria, per Mr. A. E. Rodda.—Silicified wood, flaked by aboriginals, from Jamieson, Vic.

By Mr. L. Hodgson. — Flowers of *Banksia serrata*, Saw Banksia ; *Banksia integrifolia*, Coast Banksia ; bark of *Melaleuca ericifolia* ; quartz scrapers and flints, from aboriginal kitchen middens ; quartz, showing bands of orthochrome clays ; fossilized shell — all collected at National Park, Wilson's Promontory, January, 1924.

By Messrs. A. G. Hooke and A. J. Tadgell.—Living and dried plants collected on and leading up to Mount Bogong, North-East Victoria, during January, 1924. Living. *Drosera arcturi* ; *Prasophyllum Tadgellianum*, Rogers : *Brachycome Tadgelli*, Tov. and Morris ; *Veronica serpyllifolia*, L., all from 5,800 to 6,500 feet above sea level. Dried specimens.—*Caladenia angustata* (robust form, in bloom), *Choretum lateriflorum* (in flower, 4,000 feet), *Dichondra repens* (4,000- 5,000 feet, does not appear to have been recorded at this height), *Drosera arcturi*, *Eucalyptus Sieberiana* (4,500 feet, locally known as Woolly-butt), *Hymenanthera dentata* (*H. banksii*, alpine spinous form, var. *angustifolia*, with lateral flowers on the underneath side), *Hierochlon redolens*, R. Br., Sweet Holy-grass, *Hovea longifolia* (white flowers, an unusual colour, flowers should be purple : *Dianella tasmanica* also exhibited white flowers instead of normal sky-blue), *Lycopodium clavatum* (grows among rocks), *L. selago* (rare, grows along creek banks), *Oxylobium alpestre*, *Orites lancifolium* (with Grevillea-like flowers), *Oreomyrrhis pulvinifica* (with flowers), *Podocarpus alpina* (in flower, pollen easily disturbed when plant is handled), *Ranunculus Muelleri* (previously unrecorded for Victoria ; *R. lappaceus* and *R. Gunniana* for comparison), and *Trichomanes humile*, Short Bristle-Fern (previously only recorded for Dandenong Ranges).

By Mr. W. H. A. Roger.—Felt-like ball obtained from the stomach of a sheep at Gol Gol station, N.S.W. The specimen was originally covered with a thin, light-coloured skin, of which portion only remains ; such formations are occasionally found in the stomachs of sheep, especially during a drought, and are of different shapes and sizes, some being perfectly round and as large as a cricket ball ; the female of *Apiomorpha fletcheri*,

a gall-making coccid (scale insect), a growth resembling a wooden apple, on slender branch of tree, picked up on the bank of the Murrumbidgee River, near Hay, N.S.W.

By Mr. J. Searle.—Life-history of Obelia, a hydroid polyp.

By Mr. L. Thorn. —A case containing 120 specimens of insects collected at National Park, including 12 species of Buprestids and 12 species of other beetles, 7 species of flies (Diptera), 2 species of wasps, 1 species of small grass Cicada, 6 species of Skipper Butterflies (Hesperidæ), and 2 species of Lycænid Butterflies ("Blues"), and 7 species of moths -collected during National Park excursion.

After the usual conversazione the meeting terminated.

EXCURSION TO ELTHAM.

It was gratifying that so many members resisted the temptations of Henley Day, on Saturday, 27th September, in order to have an afternoon with the birds at Eltham. The first nest visited was that of the Yellow Robin, *Eopsaltria australis*, a beautiful bark-covered nest, situated in a sapling in a quiet spot. These birds are very numerous this season. Close by was the nest of an English Blackbird which the young had just vacated. In the same gully were found nests of numerous small birds, such as the Brown Tit, *Acanthiza pusilla*, Striated Tit, *A. lineata*, Yellow-faced Honey-eater, *Ptilotis chrysotis*, White-plumed Honey-eater, *P. penicillata*, and Spinebill, *Acanthorhynchus tenuirostris*, &c. The beautiful singing notes of the Grey Thrush, *Colluricincla harmonica*, were greatly in evidence all the afternoon. Passing over the hills towards the valley of the Diamond Creek, which, owing to the recent floods, was not so alive with birds as usual, the nest of the Olive-backed Oriole, *Oriolus sagittata*, was seen hanging in the swinging bough of a Yellow Box, *Eucalyptus melliodora*, while close by, in the side of a White Gum, only about three feet from the ground, was seen the nest of a Grey Thrush. In the fallen branch of a Red Box, *E. polyanthemos*, a pair of Wattle-birds, *Acanthochæra carunculata*, had their nest, from which two young had recently left. High up in a Stringybark-tree was a nest of the White-winged Chough, *Corcorax melanorhamphus*. Many other birds were noted during the afternoon, among them being the Black-faced Cuckoo-Shrike, *Graucalus melanops*, and the White-shouldered Caterpillar-eater, *Lalage tricolor*. The afternoon quickly passed, and the members returned to town well satisfied with their outing.—W. C. Tonge.

[This report was unfortunately crowded out at the time, and has since been overlooked.—Ed. *Vict. Nat.*]

THE PLANTS OF THE "WHIPSTICK" SCRUB, BENDIGO.

By D. J. PATON

(With Map.)

(*Read before the Field Naturalists' Club of Victoria, 8th Oct.*, 1923.)

Introductory.—Seventy-two years ago, as everyone knows, Bendigo awoke suddenly from the sleep of ages. Its pastoral seclusion was rudely invaded by a host of gold-seekers, and it became within a few short months a hive of industry. From the centre, where the city of Bendigo was shortly to arise, venturous spirits struck out in all directions, wherever indications pointed to the possibility of gold being found.

Some of these, doubtless, pushing through the bush northward, came to a land where Ironbark, Box, and Stringybark were replaced by dense thickets of shrubby eucalypts with slender stems, intertwined with thick tangles of parasitic creepers. The name of "Whipstick" became applied to these dwarfed "gums," and hence the region where they grew was called the "Whipstick Scrub," or simply "the Whipstick."

This country proved to be auriferous, and seems, in the "early days," to have supported a considerable mining population, whilst—if contemporary accounts are to be believed—some who desired to avoid publicity found, in its almost impenetrable recesses, the seclusion and asylum they sought. The early inhabitants have left traces of their industry in scarred hillsides and excavated gullies, whilst often the remains of a hearth, a bit of crumbling mud-brick wall, or even a clump of Iris, Agave, or Cactus is all that remains to mark the site of their dwellings.

With the passing of the golden age the "Whipstick" seems to have returned to something of its former quietude, for agriculture passes by its barren hills for the happier regions further north. More recently, however, the eucalyptus distiller has been attracted by the high oil content of the "mallees," particularly the "blue," *Eucalyptus polybractea*, and the "green," *E. viridis*. The result has been the cutting down and partial clearance of large areas of these and other species. Roads and tracks in all directions through the scrub now make it easy to explore without the risk—an ever-present danger in the "early days"—of becoming hopelessly "bushed." But as yet the attacks of man have not appreciably lessened the area of the "formation," though its appearance, and to some extent its composition, have been changed.

The flora of the Whipstick, though not remarkably rich in species, is yet of considerable interest. Its study has been to me a source of great pleasure, and I wish to place before you

to-night some results of observations made at various times through a period of several years.

Location and Extent.—In the map accompanying this paper an attempt has been made to indicate the position and limits of the "Whipstick." It has not always been easy to do this with accuracy. In popular speech, a large and rather indefinite tract of country is called "Whipstick." Here, however, the term has been restricted to those areas where one or more of the "mallee" eucalypts actually occurs as a dominant note in the vegetation. It will be seen that in a south-westerly direction it reaches Lightning Hill and Myer's Flat, on the confines of Eaglehawk. To the north-west it extends within a mile of Neilborough and Sebastian, and, in the extreme north, to the vicinity of Kamarooka, whilst its eastward prolongation reaches a point three miles to the north of Goornong. The total area may be stated approximately at 70 square miles.

The Environment.—To the non-geological observer there does not seem to be much difference between the ordinary Bendigo auriferous formation and the ground occupied by the Whipstick. The latter will be found to correspond fairly closely with the block of Ordovician occurring north of Eaglehawk and the Bendigo Creek valley (which turns east near Huntly), and extending north almost to Kamarooka. These arid hills, mostly of small elevation, seem tumbled together almost without order, and, as compared with the zone of rich, auriferous reef country in Bendigo, are irregular and uncertain in their quartz formations.* For the most part, however, they lie more or less definitely east and west, so that the roads which traverse the scrub from south to north climb low ridges and dip into gullies in monotonous alternation. These roads provide the best means for the exploration of the district, each forming, as it were, a section across the "formation."

The gullies of the Whipstick show nothing in the way of permanent streams, nor are natural springs in evidence. Conditions are altogether drier than in the country to the south and east of Bendigo, where ranges or higher hills, intersected with deep gullies, and running approximately north and south, are separated by valleys bearing more or less permanent creeks.

To whatever extent the vegetation may be influenced by geological or climatic conditions, it certainly presents, when compared with the ordinary Bendigo flora, many features which entitle it to rank as a distinct botanical region. It has close affinity with the Inglewood "mallee," whilst it is interesting

* For this note I am indebted to Mr. C. Daley, B.A.

to note, on the other hand, that the flora of, say, One-Tree Hill or Manduraug is almost identical with that of Castlemaine, though separated from it by a broad belt of granite country.

General Aspect.—It may be well to give at the outset some account of the general aspect of typical "Whipstick" and its more frequent constituents.

"*Shrubby Eucalypts.*"—The most obvious feature is, of course, the association of shrubby eucalypts which forms, for the most part, the uppermost "story" of the vegetation. It contains at least four species of Eucalyptus—*E. viridis*, Green Mallee, *E. polybractea*, Blue Mallee, *E. Behriana*, Bull Mallee, and *E. incrassata*, Yellow or Giant Mallee. These occur in varying proportions in different parts, and only in a few localities are all four mingled. Their height also varies considerably—from less than four to more than seven metres. The south-western portions of the scrub carry *E. viridis* almost exclusively, whilst in the central region it occurs mixed with *E. polybractea* in pretty equal proportions, though the latter becomes the commoner as the eastern limits are approached. In the extreme east Green Mallee is rare. *E. Behriana* occurs over a wide area, especially in the gullies, and is generally associated with the two previous species, but especially with *E. polybractea*. On the northern fringe, where it becomes almost arborescent, it occurs mingled with *E. incrassata*. The last-named, except for one or two isolated patches, is found only towards the northern limits, where it attains a large size. Though sometimes occurring almost pure, it is usually associated with *E. Behriana* and *E. polybractea*. (*E. odorata* possibly occurs in the extreme north, but the identification of this species is not conclusive.)

A few tall shrubby plants may be considered part of this "story" for instance, the taller forms of *Melaleuca decussata* and *Acacia retinodes*, a form of *Casuarina lepidophloia*, *Evocarpus cupressiformis*, and, in some localities, *Myoporum platycarpum* and *Melaleuca parviflora*. *Eucalyptus polyanthemos* in a stunted form is also of frequent occurrence.

Associated especially with this layer of the scrub is the parasitic climber *Cassytha melantha*. This exceedingly common plant forms impenetrable tangles between and over the different plants comprising the scrub, assuming all kinds of weird forms. Its weight is often sufficient to break down its unfortunate victims. All the species of this story, and many smaller plants, are attacked with avidity, but evidently *Eucalyptus viridis* is its favourite host. Strangely enough, that other forest pest, *Loranthus pendulus*, seems to be completely absent from the Whipstick, though common enough in other parts of the Bendigo district, whilst *Cassytha melantha* is of rare occurrence

except within the Whipstick. Two non-parasitic climbers may be mentioned here. *Billardiera cymosa* is well distributed, though not very common, whilst *Clematis microphylla* occurs in the northern fringe.

Trees.—Even in the central Whipstick patches of truly arborescent eucalypts occur, standing out above the shrubby forms. *E. sideroxylon* and *E. leucoxylon* are the usual species, the latter favouring the gullies, where it sometimes attains a considerable height. *E. hemiphloia* is of frequent occurrence in the north, whilst both it and *E. macrorrhyncha* are found near Eaglehawk.

Melaleuca Scrub.—Where the "mallee" scrub is very dense little undergrowth occurs, except a few shrubs such as *Acacia acinacea*, or an occasional orchid. In many localities, however, there is comparatively little of the tall scrub, and in such places there is a very dense undergrowth, mostly composed of a few species. Probably this condition is in part natural, but generally it appears to have been a result of cutting the eucalypts for oil-distillation. Over the large area where this has taken place the scrub has been reduced to a height seldom exceeding two metres, and frequently less. The growth which has partially replaced it consists of shrubs of a height from one to two metres, which are often more conspicuous than the "mallees" themselves.

Melaleuca uncinata is by far the commonest constituent of this "story," and is usualy associated with *Casuarina distyla*, dwarf forms of *Melaleuca decussata*, *Acacia pycnantha*, *A. diffusa*, *A. hakeoides*, *Hakea rugosa*, and *Bursaria spinosa*. Plants like *Leptomeria aphylla*, *Leptospermum myrsinoides*, *Melaleuca Wilsonii*, also occur frequently, and some shrubby composites, such as *Cassinia arcuata* and a form of *C. aculeata*, are conspicuous in this layer. These form a dense scrub, waist or shoulder high, which is often very difficult to penetrate, and bears a fancied resemblance to the Melaleuca scrubs of some coastal areas.

The Underscrub.—Growing beneath and between the plants composing the taller shrubby "stories" already described, and more abundant in partially cleared areas, is a large assemblage of low shrubs, often diffuse or prostrate. These form a distinct layer or "story" of plants less than a metre high, though some of them occasionally push up among their taller brethren of the next "story." Of frequent occurrence in this group, which includes a large number of plants of decorative value, are the following: *Eriostemon difformis*, *Crowea exalata*, *Correa speciosa*, var. *normalis*, *Daviesia genistifolia*, *Eutaxia empetrifolia*, *Dillwynia ericifolia*, *Pultenæa pedunculata*, *P. largiflorens*, *Acacia oblique*, *A. vomeriformis*,

A. acinacea, *Pseudanthus ovalifolius*, *Hibbertia stricta*, *H. acicularis*, *Hybanthus floribundus*, *Baeckea ramosissima*, *Micromyrtus ciliatus*, *Calythrix tetragona*, *Boronia anemonifolia*, *Grevillea lanigera*, *Olearia teretifolia*, *Helichrysum obcordatum*, *H. adnatum*, *Dampiera lanceolata*, *Goodenia varia*, *G. amplexans*, *Westringia rigida*, *Prostanthera aspalathoides*, *P. hirtula*, *Astroloma humifusum*, *Melichrus urceolatus*, and *Brachyloma daphnoides*. Of more limited distribution are *Logania floribunda*, *Phebalium obcordatum*, *Cryptandra amara*, *Grevillea rosmarinifolia*, *Acacia lineata*, and *Olearia floribunda*. *Cassytha glabella* is the common parasite of this "story."

Herbaceous Plants.—The community of herbs, if we except such perennials as *Loudonia Behrii* and *Dianella revoluta*, is not conspicuous in the Whipstick proper. The orchids—of which more anon—are its principal constituents. Four Droseras are found, *D. Menziesii* being the common species. In most places the ground is bare of grass except for an occasional tuft of *Danthonia penicillata*, *Stipa pubescens*, *S. setacea*, or *Poa cæspitosa*. The herbs listed below occur mainly near the fringes of the Whipstick, and under somewhat moister conditions. The pretty herbaceous twiner, *Thysanotus Patersoni*, is well distributed throughout the formation.

Minute Plants.—A number of very small herbs form a group by themselves. Such are *Millotia tenuifolia*, *Brachycome collina*, *Rutidosis Pumilio*, *Centrolepis strigosa*, *Hydrocotyle capillaris*, *Crassula Sieberiana*, *C. macrantha*, *Levenhookia dubia*, *Calandrinia calyptrata*, and *C. pygmæa*. The last-named is probably the smallest flowering plant in the Whipstick; it forms red, moss-like patches, and the individual plants are often less than one centimetre in length.

General Remarks.—It will be seen that the "mallees" and the smaller shrubs, which really constitute the Whipstick, form an association of xerophilous plants, nearly all of which show special adaptation to the prevailing conditions. Some plants, it may be noted, here assume a more stunted form, adapted to the more trying situation in which they find themselves. *Grevillea lanigera* and *Correa speciosa* may be mentioned as examples.

It would hardly be expected that water-loving plants should venture far into the Whipstick. The few listed here owe their presence to a reservoir in the bush north of Eaglehawk, and the races which run to and from it. Hence the presence of Juncaceæ, *Goodenia gracilis*, and a few more such plants.

The gullies, especially where they broaden out on the fringes of the Whipstick, are favoured by a number of plants not usually found in the interior. Amongst shrubs may be mentioned *Acacia brachybotrya* (in the north), *A. sclerophylla*,

A. leprosa, *Dodonæa viscosa*, *Solanum simile*, *Olearia decurrens*, and *Myoporum platycarpum*; and, amongst herbaceous plants, *Ranunculus parviflorus*, *R. lappaceus*, *Pelargonium Rodneyanum*, *Calotis cuneifolia*, *Helichrysum lucidum*, var. *angustifolium*, and *H. semipapposum*, var. *brevifolium*.

Subdivisions of Whipstick.—The composition of the Whipstick, as will be gathered from the above summary, is by no means uniform in different localities. At least three well-marked subdivisions can be defined—(1) the Central Whipstick, including its eastward prolongation; (2) the Western Whipstick, comprising the country between Eaglehawk and Neilborough; (3) the Northern fringe. The first is the typical subdivision, the others showing an admixture of forms from adjoining "formations."

As compared with the central portion, the western Whipstick presents several distinctive features. For instance, the "Whipstick" of the west is almost pure *E. viridis*, patches of *E. polybractea* and *E. Behriana* being found only rarely. Also, in many places, especially near Eaglehawk, the "mallee" occurs only as "islands" in a forest of arborescent eucalypts. Contrast this with the continuous mixed scrub of the central Whipstick. There is also in the western area an admixture of species from the ordinary Bendigo flora which do not occur in the central region—plants like *Acacia acinacea*, *Eriostemon obovalis*, *Cheiranthera linearis*, and *Tetratheca ciliata*. On the other hand, "central" plants such as *Pseudanthus ovalifolius*, *Prostanthera aspalathoides*, *Acacia obliqua*, *A. lineata*, *Eriostemon difformis*, *Helichrysum adnatum*, *Olearia decurrens*, *Westringia rigida*, var. *grevillina*, and *Myoporum platycarpum* are absent from the west. The species confined to each subdivision, and those common to all, are indicated in the appended list. The boundary between the western and central Whipstick is represented approximately by the track marked II. on the map. On this track plants of both regions are found. For example, *Eriostemon obovalis* and *E. difformis* both occur here, whilst farther east the former species completely disappears.

The northern fringe is not so easily defined, although in the field the transition from the central scrub is easily observed. The principal feature of this section is the dominance of *Eucalyptus incrassata*. This occurs only in the portion which "bulges" northward towards Kamarooka. On the tracks IV., V., and VI., where it is most conspicuous, the fringe may be fully a mile through. Approached from the south, this scrub of "Giant Mallee" and other species is at first very dense, and as one proceeds the plants become taller, *E. incrassata* especially reaching almost the dignity of a tree. Finally, on the northern edge, the bush becomes open and

somewhat park like, with occasional patches of *E. Behriana* or *E. incrassata* eight metres or more in height, mixed with *E. hemiphloia* and *E. leucoxylon*. In this open part appear several species which are not found elsewhere in the district, notably *Fusanus acuminatus*, *Pittosporum phillyraeoides*, *Melaleuca parviflora*, *Pomaderris racemosa*, *Stenopetalum lineare*, *Calocephalus Sonderi*, and *Mesembrianthemum aequilaterale*; also some plants, such as *Clematis microphylla* and *Stackhousia linarifolia*, which are not found elsewhere in the Whipstick. This is probably the transition to a new flora—that of the plains; but owing to its distance from Bendigo, and the fact that the country farther north is largely cultivated, and so has lost much of its original vegetation, I have been unable to investigate this fully. We have been wont to call the most promising part of this region the "Mystery Paddock," since, like Africa, it always yielded "something new."

Gregarious Species.—I shall not further tax your patience by attempting to describe in detail any of the local sub-associations of plants. A notable feature of the Whipstick is the gregarious nature of many species. Such remarkable plants as *Phebalium obcordatum*, *Cryptandra amara*, and *Acacia lineata* are found in large numbers in one limited area, and apparently nowhere else in the formation. The approximate position of these "patches" is indicated on the map. On the other hand, gregarious plants like *Baeckea ramosissima*, *Acacia hakeoides*, and *Boronia anemonifolia* are well distributed in many places.

"*The Whipstick Beautiful.*"—The Whipstick, indeed, is a land of delightful surprises. Who would expect to find *Astrotricha ledifolia* there, or Crowea, or *Pomaderris racemosa*, or *Logania floribunda*? Sometimes a tract of uninteresting country, with little but "mallee" to look at, will open suddenly into a very garden of delight. Such is the locality near Myer's Flat,* where, amongst a host of beautiful things, *Boronia anemonifolia* and *Cryptandra amara* are "bright particular stars." Then there is Flagstaff Hill,† the special glory of which is *Phebalium obcordatum*, and "Westringia Ridge,"‡ where the beautiful *Westringia rigida*, var. *grevillina*, and the shy, sweet-scented *Logania floribunda* lurk, and where the blue of *Dampiera lanceolata*, the scarlet of *Prostanthera aspalathoides*, and the gold of Loudonia are mingled: and there are places on the Kamarooka road where the purple *Prostanthera hirtula* vies with the scarlet *Prostanthera aspalathoides*, and where humble brown Daviesias and golden Loudonia, rosy Bæckea and snowy Olearia, pale Pseudanthus and pink Boronia,

* *Vide* "Excursion to Bendigo" (*Vict. Nat.*, xxxvi., p. 102).
† *Vide Vict. Nat.*, xxxviii., p. 87.
‡ *Vide Vict. Nat.*, xxxvii., p. 95.

Calythrix, and Micromyrtus, red Grevillea and blue Dampiera, and starry Eriostemon, compete to delight the eye.

This is the many-hued garment wherewith September and October rejoice the "wilderness and the solitary place," and which November faintly imitates, adding to its fading colours her own Melaleucas and Pultenæas and Everlastings. Yet more gorgeous is August's golden raiment—the gold of *Acacia pycnantha*, *A. hakeoides*, *A. aspera*, *A. leprosa*, and others. The Golden Wattle needs no praise, as it lights up these green solitudes with early sunshine; yet not it, but *A. hakeoides*, is *the* Acacia of the Whipstick. It occurs in two distinct forms, the commoner (to which these remarks apply) having very narrow phyllodes, whilst the rarer form has broader phyllodes and larger flower-heads, resembling the narrow-leaved form of *A. pycnantha*. A bush of this species in full bloom—a mound of pure gold—is a wonderful sight. To see acres of plants at once in the full blaze of their glory is a wonder that can hardly be described; yet it may be seen at many places in the Whipstick in the last days of August. By mid-September their brief glory is over. "He hath made everything beautiful in his time."

These are specially months of flowers, but at other times, in its everyday garb of green, the Whipstick has attractions. There are no empty months in its calendar. December, with *Melaleuca uncinata* and *Myoporum platycarpum*; January, with *Acacia retinodes*, *Choretrum glomeratum*, and the lovely *Melaleuca parviflora*; and February, with *Fusanus acuminatus*, *Olearia decurrens*, and *Cassinia aculeata*, have made it worth while to venture out in the heat of midsummer. Then there are the "Mallees" themselves, which flower with some irregularity from January to June. Even in the dull autumn and winter months we have *Leptomeria aphylla*, *Acacia diffusa*, *Olearia floribunda*, *Astroloma humifusum*, *Hakea rugosa*, and *Acacia lineata*, each with its own interest and beauty.

Orchids.—Something may here be said about orchids, which have hardly been mentioned so far. They do not seem to play a great part in the economy of the Whipstick. Twenty-two species are listed, but some of these are seldom found, while some are only found near the border. The following may be mentioned as being comparatively common:—*Thelymitra aristata* and *T. antennifera*, *Pterostylis nana*, *P. parviflora*, *P. cycnocephala*, *Caladenia testacea*, *C. angustata*, *C. cærulea*, and *C. carnea*, and *Glossodia major*. *Calochilus campestris* is included on the authority of C. French, sen.* I have not collected this species, though *C. Robertsoni* is sometimes found.

* "Orchids of Victoria" (*Vict. Nat.*, i., p. 56).

PLATE XV.

REFERENCES TO MAP OF WHIPSTICK SCRUB.

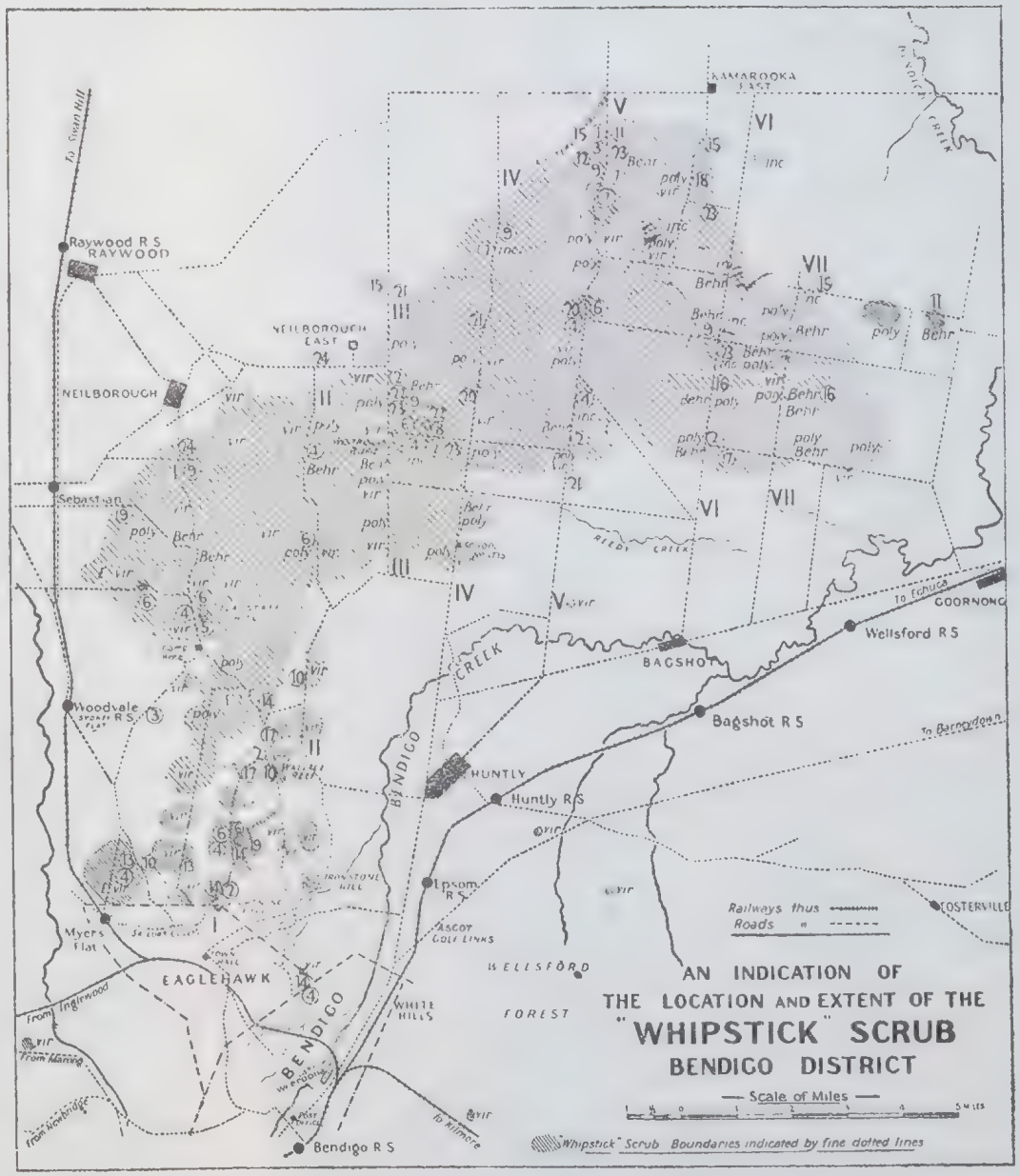
ABBREVIATIONS FOR "MALLEE EUCALYPTS":—

Viridis or Vir = Green Mallee.
Poly (= Polybractea) = Blue Mallee.
Behr (= Behriana) = Bull Mallee.
Inc (= Incrassata) = Giant Mallee.

OTHER PLANTS OF "WHIPSTICK" ASSOCIATION:—

1. *Stenopetalum lineare.*
2. *Billardiera cymosa.*
3. *Pittosporum phillyræoides.*
4. *Boronia anemonifolia.*
5. *Phebalium obcordatum.*
6. *Crowea exalata.*
7. *Mesembryanthemum æquilaterale.*
8. *Acacia lineata.*
9. *A. brachybotrya.*
10. *A. hakeoides.*
11. *Melaleuca parviflora.*
12. *Pomaderris racemosa.*
13. *Cryptandra amara.*
14. *Astrotricha ledifolia.*
15. *Fusanus acuminata.*
16. *Choretrum glomeratum.*
17. *Grevillea rosmarinifolia.*
18. *Calocephalus sonderi.*
19. *Goodenia gracilis.*
20. *Logania floribunda.*
21. *Solanum simile.*
22. *Westringia rigida* (var. *grevilleana*).
23. *Myoporum platycarpum.*
24. *M. deserti.*

Plants not listed above are generally of fairly wide distribution.



Contrast of Whipstick with Bendigo Flora.—Some statistics may render more evident the contrast between the flora of the Whipstick and the ordinary "Bendigo" type, as seen to the south and east of the city. Of the 227 species and varieties listed for the Whipstick, 40 are not found at all in the Bendigo bush, while 24 more, though common in the Whipstick, occur only rarely or in isolated patches outside its bounds. About 105 species which seem equally well distributed in both districts may be regarded as common, whilst the remaining 58 occur only rarely in the Whipstick, and are probably, in most cases, invaders from without, especially as they are usually seen near its boundaries. When it is mentioned that over 130 species of the richer "Bendigo" flora do not enter the Whipstick at all, the contrast is made still more remarkable.

Some interesting comparisons may be made in the representation of the principal families. Taking the principal oil-producing families, we find them very well represented in the Whipstick. Thus, Rutaceæ has six Whipstick species, representing 2.6 per cent. of the flora, while "Bendigo" has only three (1 per cent.); Myrtaceæ, excluding Eucalyptus, has eight Whipstick forms (3.5 per cent.) and eight "Bendigo" forms (2.5 per cent.); Eucalyptus has eleven Whipstick and ten "Bendigo" species (4.8 per cent. and 3 per cent. respectively); Labiatæ has four Whipstick and four "Bendigo" representatives (1.75 per cent. and 1.25 per cent.) Thus, about one-eighth of the Whipstick plants are oil-bearing, against one-thirteenth of the "Bendigo" plants. Were the count of individuals per acre instead of species, the result would be much more in favour of the Whipstick, where the oil-bearing forms are very common.

On the other hand, the Whipstick is very deficient in Papilionates, having only eight representatives of five genera (3.5 per cent.) against twenty-three representatives of sixteen genera (7.2 per cent.) in the "Bendigo" scrub. Acacias are pretty evenly balanced twelve Whipstick (5.3 per cent.) and seventeen "Bendigo" (5.3 per cent.) species. The constituent species, however, differ greatly; there are, for example, no Bipinnatæ in the Whipstick.

Composites, especially the shrubby ones, are very well represented, thirty-six species and varieties (15.8 per cent.) being found, as compared with forty-one (12.8 per cent.) in the richer Bendigo flora. Orchids make a poor showing—twenty-two species (9.7 per cent.), compared with forty-five from the "Bendigo" formation (14 per cent.) Liliaceæ are evenly balanced, comprising about 4 per cent. of each flora. The Epacrids are common to both divisions, except that *Leucopogon virgatus* does not seem to occur in the Whipstick.

Other notable families well represented are Pittosporaceæ,

Santalaceæ, and Goodeniaceæ, whilst Proteaceæ, Chenopodiaceæ, Cyperaceæ, and Gramineæ are poorly represented. Ferns are practically absent from the Whipstick, though a stunted form of *Cheilanthes tenuifolia* is occasionally found in gravelly patches near the southern boundary. The "Bendigo" flora has seven species of ferns.

Former Extent of Whipstick.—In concluding an attempt to describe the Whipstick as it is, one may perhaps be pardoned for indulging some speculations as to its past. It seems certain that the "formation" had once a much greater extent. The great similarity in the composition of the Whipstick and the Inglewood "mallee," which has been already suggested, is remarkable in view of the fact that 18 miles intervene between the nearest points of the two scrubs—eighteen miles of plain country, and the Loddon valley, with its basalt flows. Again, in the Rushworth district, some 30 miles to the east of the Whipstick, we have a similar though smaller area, in which *Eucalyptus viridis*, *E. polybractea*, and *E. Behriana* are found. Somehow the idea emerges of an association of shrubby eucalypts resembling the "mallee," and, with their attendant undergrowth, extending over a large area of northern Victoria. The Whipstick and the other areas I have named seem to be but surviving fragments—islands, as it were, in a sea of more recent plant forms. The fragment of "mallee" vegetation at Werribee Gorge, though far from our present purpose, is suggestive of a probable former extension of that type far beyond its present limits.

Within the Bendigo district itself evidences that the Whipstick had once a much greater extent are not wanting. Isolated clumps of *Eucalyptus viridis* occur at distances of several miles from the present boundaries of the "formation." The approximate position of some which I have noted is indicated on the map; no doubt others have escaped notice. It will be seen that these patches occur as far south as the Marong road, to the west of the city, and the Heathcote railway to the east. Moreover, many localities in the intervening spaces show some characters of "Whipstick," though the "mallees" are not actually present. This applies to much of the country between the city boundary and Ironstone Hill.* Some of the vegetation on the Fosterville road suggests the same idea, species such as *Acacia hakeoides*, *A. sclerophylla*, *Loudonia Behrii*, *Westringia rigida*, and the like occurring in quantity. *Melaleuca Wilsonii* occurs in the Wellsford Forest, as well as some clumps of "Green Mallee."

Even in the heart of the "Bendigo" formation one finds

* *Vide* "Excursion to Bendigo" (*Vict. Nat.*, xxxix., p. 84).

what look like survivals—*Acacia hakeoides* near Strathfieldsaye, *Loudonia Behrii* in several places (one quite near to Big Hill), two or more patches of *Baeckea ramosissima*, and a large isolated patch of *Boronia anemonifolia* near Diamond Hill.

In the country immediately north of Eaglehawk the process of replacement appears to be now in progress. Here occur numerous "islands" of *Eucalyptus viridis*, with or without the usual Whipstick undergrowth. Some of these "islands" have an area of hundreds of acres, others consist of a few clumps only. Between the "islands" we find arborescent eucalypts of the species usually found in the Bendigo bush, whilst the undergrowth contains many "Bendigo" forms which do not occur in the Whipstick proper. It is generally, though not always, on rocky hillsides that the "mallees" have survived, whilst the invaders creep up the gullies between. Such a hill, crowned with graceful, waving tufts of "Green Mallee," is suggestive of a fortress, where an ancient race makes its final stand against the invader who has captured the valley below.

However that may be, the Whipstick yet remains to us a land somewhat weird and mysterious—the "Ultima Thule" of childish imaginings, the happy hunting ground of maturer years. As far as human interference goes, it is likely to survive longer than many another Victorian plant association. Its sterility, which has been its salvation in the past, will probably long permit its hardy plants to retain possession of the uninviting home they have chosen.

I have been greatly indebted to the National Herbarium authorities for the determination of many of the more unusual plants here mentioned. My thankful acknowledgments are also due to several members of the Club—especially to Mr. C. Daley and Dr. Sutton—for many kindly hints and suggestions and much information. Mr. A. D. Hardy has been so good as to re-draw my map for publication.

The following list of Whipstick plants does not claim absolute completeness. The sequence of families and the nomenclature of genera and species is that of the "Census" recently published. Flowering times are shown. The letters *c*, *w*, and *n* represent the central, western, and northern sections as defined above. The symbol * indicates that the plant is found in the Whipstick, but not in the "Bendigo" formation: † indicates a Whipstick plant occasionally found in "Bendigo" bush; ‡ a plant equally common in both areas; and § a "Bendigo" plant only occasionally found in the Whipstick:—

POLYPODIACEÆ.

w§Cheilanthes tenuifolia (Burm.), Sw.

GRAMINEÆ—

cwn‡Themeda triandra, Forst. (Nov.)
cwn‡Stipa pubescens, R. Br. (Oct., Nov.)
cwn‡S. setacea, R. Br. (Oct., Nov.)
n §Calamagrostis filiformis (Forst.), Pilger (Nov.)
cwn‡Danthonia penicillata, F. v. M. (Nov.)
w‡D. penicillata, var. pallida, F. v. M. (Nov.)
w §Cynodon Dactylon, Rich. (Dec.–Feb.)
w §Eragrostis Brownii, Nees. (Dec.–Mar.)
n §Poa cæspitosa, G. Forst. (Oct., Nov.)

CYPERACEÆ—

w §Cyperus Eragrostis, Vahl. (Mar.–May).
cw‡Lepidosperma laterale, R. Br. (Dec.–May).
wn‡Carex appressa, R. Br. (Oct., Nov.)

CENTROLEPIDACEÆ—

w‡Centrolepis strigosa (R. Br.), Roem. and Sch. (Oct.)

JUNCACEÆ—

w §Juncus polyanthemos, Buch. (Sept., Oct.)
cwn‡J. pauciflorus, R. Br. (Sept.–Nov.)
§J. prismatocarpus, Bth. (Nov.–Mar.)

LILIACEÆ—

w §Burchardia umbellata, R. Br. (Oct., Nov.)
cw §Anguillaria dioica, R. Br. (Aug., Sept.)
w §Bulbine bulbosa, Haw. (Oct.)
cwn‡Thysanotus Patersoni, R. Br. (Oct.)
w §Dichopogon strictus (R. Br.), J. G. Baker (Oct., Nov.)
cw §Arthropodium minus, R. Br. (Oct., Nov.)
cwn‡Dianella revoluta, R. Br. (Oct., Nov.)
cw‡Lomandra multiflora (R. Br.), Britten (Sept., Oct.)
cw‡L. filiformis (Thunb.), Britten (Sept., Oct.)

AMARYLLIDACEÆ—

cwn §Hypoxis glabella, R. Br. (Aug.–Oct.)

ORCHIDACEÆ—

cwn‡Prasophyllum nigricans, R. Br. (Mar., April).
*?w**Calochilus campestris, R. Br.
w‡C. Robertsonii, Bth. (Oct.)
cw‡Thelymitra aristata, Lindl. (Oct.)
cw‡T. antennifera, Hook f. (Oct.)
cw §T. longifolia, R. & G. Forst. (Oct.)
w‡Microtis porrifolia, R. Br. (Oct., Nov.)
w §Eriochilus autumnalis, R. Br. (April, May).
cw‡Caladenia angustata, Fitz. (Oct.)
cw‡C. cœrulea, R. Br. (Aug., Sept.)
cw‡C. carnea, R. Br. (Sept.)
cw‡Caladenia testacea, R. Br. (Sept., Oct.)
cw‡Glossodia major, R. Br. (Sept., Oct.)
cw §Diuris maculata, Sm. (Aug., Sept.)
w §D. sulphurea, R. Br. (Oct.)
n §Pterostylis alata (Labill.), Reich. (June, July).
cw‡P. cycnocephala, Fitz. (Aug.–Oct.)
w‡P. mutica, R. Br. (Oct.)
cwn‡P. nana, R. Br. (Aug., Sept.)
cw‡P. parviflora, R. Br. (April, May).
w §P. rufa, R. Br. (Nov.)
wn §P. reflexa, R. Br. (April-June).

CASUARINACEÆ—
cwn‡Casuarina lepidophloia, F. v. M. (July–Sept.)
cwn†C. distyla, Vent. (May–Oct.)

PROTEACEÆ—
w§Persoonia rigida, R. Br. (Dec.)
cw‡Grevillea lanigera, A. Cunn. (Aug.–Nov.)
cw‡G. rosmarinifolia, A. Cunn. (Aug., Sept.)
cw‡Hakea rugosa, R. Br. (May–Aug.)

SANTALACEÆ—
cwn‡Exocarpus cupressiformis, Labill. (Jan.–July).
w†E. stricta, R. Br. (Sept., Oct.)
*n**Fusanus acuminatus, R. Br. (Jan., Feb.)
*c**Choretrum glomeratum, R. Br. (Jan., Feb.)
cw†Leptomeria aphylla, R. Br. (Feb.–June).

CHENOPODIACEÆ—
n‡Rhagodia nutans, R. Br. (Dec., Jan.)
*cn**R. hastata, R. Br. (Nov.–Jan.)
cn‡Atriplex semibaccatum, R. Br. (Nov., Dec.)

AIZOACEÆ—
*n**Mesembrianthemum æquilaterale, Haw. (Sept., Oct.)

PORTULACACEÆ—
cw†Calandrinia calyptrata, Hk. f. (Sept.)
*c**C. pygmæa, F. v. M. (Sept.)

CARYOPHYLLACEÆ—
*w**Sagina apetala, L. (Oct.)

RANUNCULACEÆ—
n†Clematis microphylla, DC. (Aug., Sept.)
cwn§Ranunculus lappaceus, Sm. (Aug.–Oct.)
cn‡R. parviflorus, L. (Sept., Oct.)

LAURACEÆ—
cw‡Cassytha glabella, R. Br. (Dec., Jan.)
cwn†C. melantha, R. Br. (Sept., Oct.)

CRUCIFERÆ—
*n**Stenopetalum lineare, R. Br. (Oct.)
*n**Lepidium hyssopifolium, Desv. (Oct.)

DROSERACEÆ—
w‡Drosera glanduligera, Lehm. (Sept., Oct.)
cwn‡D. auriculata, Backh. (Sept.)
w§D. peltata, Sm. (Sept., Oct.)
cw‡D. Menziesii, R. Br. (Aug., Sept.)

CRASSULACEÆ—
cw‡Crassula Sieberiana (Sch.), Ostenf. (Sept.)
cw‡C. macrantha (Hk. f.), Diels & Pritz (Oct.)

PITTOSPORACEÆ—
*n**Pittosporum phillyræoides, DC. (Oct., Nov.)
cw‡Marianthus procumbens, Bth. (Sept., Oct.)
cwn‡Bursaria spinosa, Cav. (Nov.–Jan.)
*cwn**Billardiera cymosa, F. v. M. (Oct., Nov.)
w§Cheiranthera linearis, A. Cunn. (Nov.)

ROSACEÆ—
w§Acæna ovina, A. Cunn. (Oct., Nov.)

LEGUMINOSÆ—
w‡Acacia aspera, Lindl. (Aug., Sept.)
w‡A. acinacea, Lindl. (Sept., Oct.)

LEGUMINOSÆ—*continued.*

*cwn**A. brachybotrya, Bth. (Oct.)
cw‡A. diffusa, Edwards (Mar.–Sept.)
cwn†A. hakeoides, A. Cunn. (Aug., Sept.)
*c**A. lineata, A. Cunn. (June, July).
cw‡A. leprosa, Sieb. (Aug., Sept.)
*cn**A. obliqua, A. Cunn. (Sept., Oct.)
cwn‡A. pycnantha, Bth. (July–Sept.)
cwn‡A. retinodes, Schlech. (Jan., Feb.)
cwn†A. sclerophylla, Lindl. (Aug., Sept.)
cw‡A. vomeriformis, A. Cunn. (July–Sept.)
cw§Daviesia corymbosa, Sm. (Sept., Oct.)
cwn‡D. ulicina, Sm. (Aug.–Oct.)
cwn†D. genistifolia, A. Cunn. (Sept., Oct.)
cw‡Pultenæa largiflorens, F. v. M. (Nov., Dec.)
cw‡P. pedunculata, Hk. (Sept., Oct.)
cw‡Eutaxia empetrifolia, Schlech. (Sept., Oct.)
cw‡Dillwynia ericifolia, Sm. (Oct., Nov.)
w§Kennedya prostrata, R. Br. (Sept., Oct.)

GERANIACEÆ—

w§Geranium dissectum, L. (Aug.–Oct.)
w§Pelargonium Rodneyanum, Lindl. (Nov.–Jan.)

OXALIDACEÆ—

cwn‡Oxalis corniculata, L. (Sept., Oct.)

RUTACEÆ—

cw†Boronia anemonifolia, A. Cunn. (Aug.–Oct.)
w‡Eriostemon obovalis, A. Cunn. (Aug.–Oct.)
*cw**E. difformis, A. Cunn. (Sept.–Nov.)
*w**Phebalium obcordatum, A. Cunn. (Aug., Sept.)
*cw**Crowea exalata, F. v. M. (Oct.-Dec.)
cwn‡Correa speciosa, Andr., var. normalis (June–Aug.)

TREMANDRACEÆ—

w§Tetratheca ciliata, Lindl. (Aug.–Oct.)

EUPHORBIACEÆ—

*c**Pseudanthus ovalifolius, F. v. M. (Aug.–Oct.)

STACKHOUSIACEÆ—

n§Stackhousia linarifolia, A. Cunn. (Oct.)

SAPINDACEÆ—

cn‡Dodonæa viscosa, Jacq. (Mar.–July).

RHAMNACEÆ

*n**Pomaderris racemosa, Hk. (Oct.)
w†Cryptandra amara, Sm. (Aug., Sept.)

DILLENIACEÆ

w‡Hibbertia densiflora, F. v. M. (Sept.–Nov.)
cw‡H. stricta, R. Br. (Sept.–Nov.)
cw‡H. acicularis, F. v. M. (Sept., Oct.)

GUTTIFERÆ—

w§Hypericum japonicum, Thunb. (Oct.–Dec.)

VIOLACEÆ—

cw‡Hybanthus floribundus, F. v. M. (July–Sept.)

THYMELEACEÆ

cwn§Pimelea spathulata, Labill. (June–Oct.)

LYTHRACEÆ—

w§Lythrumhyssopifolia, L. (Nov.–Jan.)

MYRTACEÆ—

*cwn**Eucalyptus Behriana, F. v. M. (Jan.–April).
cwn‡E. hemiphloia, F. v. M. (Jan.–June).
*cn**E. incrassata, Labill. (Mar.–May).

MYRTACEÆ—*continued.*
cwn‡E. leucoxylon, F. v. M. (Mar.–Nov.)
w§E. macrorrhyncha, F. v. M. (Jan.)
w§E. melliodora, A. Cunn. (Nov.–Jan.)
*n**E. odorata, Behr. (?) (July).
*cwn**E. polybractea, R. T. B. (May–Aug.)
cw‡E. polyanthemos, Sch. (Sept., Oct.)
cw‡E. sideroxylon (Woolls), A. Cunn. (April–Sept.)
*cwn**E. viridis, R. T. B. (Dec.–Feb.)
cw‡Leptospermum myrsinoides, Schlech. (Sept., Oct.)
*n**Melaleuca parviflora, Lindl. (Jan.)
cwn†M. uncinata, R. Br. (Nov., Dec.)
cwn‡M. decussata, R. Br. (Oct.–Dec.)
cw†M. Wilsonii, R. Br. (Oct., Nov.)
cw†Bæckea ramosissima, A. Cunn. (Sept., Oct.)
cw‡Calythrix tetragona, Labill. (Oct., Nov.)
*cw**Micromyrtus ciliatus (Sm.), J. M. Black (Sept., Oct.)

ŒNOTHERACEÆ—
w§Epilobium junceum, G. Forst. (Nov., Dec.)

HALORRHAGIDACEÆ—
cw†Loudonia Behrii, Schlech. (Oct., Nov.)
w‡Halorrhagis elata, A. Cunn. (Nov.)
cw‡H. teucroides, P. DC. (Oct., Nov.)

ARALIACEÆ—
w†Astrotricha ledifolia, DC. (Sept., Oct.)

UMBELLIFERÆ—
cwn‡Hydrocotyle laxiflora, DC. (Nov.)
cw‡H. capillaris, F. v. M. (Oct.)
w§H. asiatica, L. (Jan.)
w§Eryngium rostratum, Cav. (Nov., Dec.)
cwn‡Daucus brachiatus, Sieb. (Sept., Oct.)

EPACRIDACEÆ—
cwn‡Astroloma humifusum, R. Br. (Mar.–July).
cw‡Melichrus urceolatus, R. Br. (June–Aug.)
cw§Lissanthe strigosa, R. Br. (Aug., Sept.)
cw†Leucopogon rufus, Lindl. (Dec.–May).
w‡Acrotriche serrulata, R. Br. (Aug.)
cw‡Brachyloma daphnoides, Bth. (Oct., Nov.)

LOGANIACEÆ—
*c**Logania floribunda, R. Br. (Sept.)

GENTIANACEÆ—
cw‡Sebæa ovata, R. Br. (Sept., Oct.)
w§Erythræa australis, R. Br. (Nov.–Feb.)

LABIATÆ—
cw‡Prostanthera hirtula, F. v. M. (Sept., Oct.)
*cn**P. aspalathoides, A. Cunn. (Sept., Oct.)
cw†Westringia rigida, R. Br. (Sept., Oct.)
*c**W. rigida, R. Br., var. Grevillina (Sept., Oct.)

SOLANACEÆ—
*cn**Solanum simile, F. v. M. (Sept., Oct.)

SCROPHULARIACEÆ—
cnw‡Veronica calycina, R. Br. (Sept., Oct.)

MYOPORACEÆ—
*cw**Myoporum deserti, A. Cunn. (Aug.)
w†M. Dampieri, A. Cunn.
*cn**M. platycarpum, R. Br. (Nov., Dec.)

PLANTAGINACEÆ—
wn§Plantago varia, R. Br. (Oct., Nov.)

RUBIACEÆ—
wn§Galium australe, DC. (Sept., Oct.)
n§Asperula scoparia, Hk. f. (Sept., Oct.)
CAMPANULACEÆ—
c‡Lobelia gibbosa, Labill. (Dec., Jan.)
w§Wahlenbergia gracilis, A. D. C. (Oct., Nov., April, May).
GOODENIACEÆ—
cwn†Goodenia varia, R. Br. (Oct.–Dec., Jan.–June).
cwn‡G. geniculata, R. Br. (Sept.–Nov.)
*cwn**G. amplexans, F. v. M. (Oct.–Dec., May, June).
w§G. elongata, Labill. (Oct., Nov.)
w§G. pinnatifida, Schlech. (Oct.)
*w**G. gracilis, R. Br. (Dec.–Mar.)
cw†Dampiera lanceolata, A. Cunn. (Sept.-Nov.)
BRUNONIACEÆ—
w§Brunonia australis, Sm. (Oct., Nov.)
STYLIDIACEÆ—
w‡Stylidium graminifolium, Swartz (Oct., Nov.)
w‡S. despectum, F. v. M. (Sept., Oct.)
cw‡Levenhookia dubia, Sond. (Sept., Oct.)
COMPOSITÆ—
*cn**Olearia decurrens, Bth. (Jan., Feb.)
*c**O. floribunda, Bth. (Mar.)
w‡O. microphylla, Vent. (Sept., Oct.)
w§O. ramulosa, Bth. (Oct., Nov.)
cw†O. teretifolia, F. v. M. (Aug.–Oct.)
wn†Vittadinia australis, A. Rich. (Oct., Nov.)
*cn**Calotis cuneifolia, R. Br. (Aug.)
n§Lagenophora Billardieri, Cass. (Oct.)
cwn‡Brachycome collina, Bth. (Sept.)
cn‡B. exilis, Sond. (Oct.)
cn‡B. multifida, DC. (Oct.)
cw‡Cotula coronopifolia, L. (Sept.–Nov.)
w§Centipeda Cunninghami, F. v. M. (Dec.–Feb.)
w†Myriocephalus rhizocephalus, Bth. (Oct.)
*n**Calocephalus Sonderi, F. v. M. (Oct., Nov.)
cw§Craspedia Richea, Cass. (Aug., Sept.)
cw‡Cassinia aculeata, R. Br. (affin. var. uncata, Bth.) (Jan.–April).
cwn‡C. arcuata, R. Br. (Mar.–May).
w§Humea ozothamnoides, F. v. M. (Nov., Dec.)
cw‡Rutidosis Pumilo, Bth. (Oct.)
cw‡Millotia tenuifolia, Cass. (Sept.)
wn§Podolepis acuminata, R. Br. (Oct., Nov.)
w§Leptorrhynchus squamatus, Less. (Oct., Nov.)
w‡L. tetrachætus (Schl.), J. M. Black (Dec.)
*cn**Helichrysum adnatum, Bth. (Nov., Dec.)
wn§H. apiculatum, DC. (Oct., Nov.)
cw‡H. lucidum, Henck. (var. angustifolium) (Oct.–Dec.)
cwn†H. obcordatum, F. v. M. (Oct., Nov.)
wn‡H. semipapposum, DC. (Sept.–Nov.)
*cwn**H. semipapposum, DC. (var. brevifolium, Sonder) (Jan.–April).
wn†Helipterum corymbiflorum, Schlech. (Oct.)
cwn‡H. australis (Gray), Osteni. (Sept., Oct.)
w§Gnaphalium luteo-album, L. (Nov.–Feb.)
wn‡Stuartiana Muelleri, Sond. (Oct., Nov.)
cwn‡Erechtites quadridentata, DC. (Sept.–April).
cw‡Microseris scapigera (Forst.), Sch. Dip. (Sept., Oct.)

BIRD NOTES.

Birds in a Garden at Lardner.—How many members who sought birds in the holidays have as good a list as I have, and all of them under observation from the verandah of our house? We have some strangers to the district. Firstly, the English Blackbird, *Turdus merula*, which built their nest in a Camellia bush not more than twenty feet from where we all congregate on the verandah on hot days for afternoon tea. There they reared three lots of young -two in the first, four in the second, and we are sure of one in the third; there may have been more, but we were so surprised to find them we frightened the young birds out of the nest. How shy the Blackbird is! And yet he is quite cheeky, and visits each door for scraps.

The Harmonious Thrush, *Colluricincla harmonica*, has overcome his shyness, and will take his meals from my hand. There are several, and bounce me to "Get my dinner, quick," which call brings also the Sparrows, which are not at all shy or backward. Two trees grow within six feet of the diningroom door, and in one of them is the Goldfinch's nest, and the other is the Sparrow's choice. Another few yards away, in front of the Galah cage, hangs the Yellow-rumped Tit's nest, and twice that distance further out the beautifully-made nest of the Olive-backed Oriole, *Mimetes sagittata*, is woven on to the tree branch. This bird we found most interesting. One, or perhaps either, of the pair sat on a water-pipe outside the pantry window and whistled the common call of the Black-faced Cuckoo-Shrike the whole day; then we discovered it carrying a long piece of twine, which it lost, and to this day hangs in another tree. The young of this pair of Orioles left the nest yesterday, very young and still downy. One was not at all distressed when caught, and it was only quiet while held in one's hands. These birds are fruit-eating, but we forgave them the cherry robbery when we found they were so fond of the pretty caterpillar found so numerously on Virginian creeper, and which later turns into the day-flying black and white and gold moth, *Agarista glycina*.

We are out among the trees now, and Bell-birds—or, rather, Bell Miners *Manorina melanophrys*, are so musical all day long. Even one of these shy birds found its way on to the verandah, to its surprise, and I hear four of them in the garden in the early morning. How we notice if once they cease their musical notes in the tops of the trees! And yet they come low down in the bushes in the evening.

Two old pioneers returned one morning the large Black Cockatoo, *Calyptorhynchus funereus*. We have not seen or heard one here for some years. Gang Gangs, *Callocephalum galeatum*, appear when the berries are red on the rowan tree. They

were here a fortnight ago, in a messmate at the gate—eight of them, and seemed to recognize our harmlessness.

To-day, in the grassy part of the garden, in tall cocksfoot, I saw an Emu-Wren, *Stipiturus malachurus*, with its long cotton feathers in its tail, keeping them nice and smooth. I have not seen one for months: burning-off disturbs them so.

The Blue Wren, *Malurus cyanochlamys*, and his retinue come to the door for crumbs, and presently will congregate with Striated Tits and Fire-tailed Finches, and all will be one big flock. I have seen fourteen Firetails bathing in a kerosene tin which held a water-lily plant beneath the water. They used it as a bathing pool, and they paid far more attention to the objections of the Yellow-breasted Shrike-Robin than they did to mere humans who were about.

The Welcome Swallow reared four young under the verandah. Ungracious birds I found them. After spending some time one hot night shading the young from a light I had on the verandah, they awakened me next morning at daybreak, and for peace sake I left the verandah myself.

The Mountain Thrush has returned, and runs about finding his favourite worms easily this year, and calling anathema on his head when the gardener finds her sheltered seedlings all picked out by this bird in the search for worms; but the bird is a great favourite.

Three Boobook Owls (Mopokes) were disturbed in the orchard, and the Mudlarks, *Grallina picata*, gave them a bad time for the rest of the day.

The Black-and-White Fantail appears after a wet night, while the White-shafted Fantail is always on the west verandah during an east wind: and this year we add another Flycatcher to our list—the Satin Flycatcher. The Honey-eaters are very numerous. Our old friends the Spinebills are first. I have assisted them with their small family several times in wet weather, when the honey in the flowers is too wet for food, and have given a young Spinebill honey out of a spoon. They never seem to forget. There are always feuds amongst the different varieties. The Wattle-bird is big and noisy. The White-eared is very busy, and calling "Cherry Bob." The Tawny-crowned comes in from his Banksia patch in the bush, and another, small, brownish-grey with yellow feathers on and wings, is a new one here; we have not placed it yet.

Are you surprised that the Starling has not been recorded yet? He is *not* in the garden, but since the young have arrived they have gone to the crops, where the caterpillars are, and I must say that, though there were dozens a few weeks ago, they left the garden to the Parrots, who do so much mischief. Parrots, both Red Lory, *Aprosmictus cyanopygius*, and Rosellas, *Platycercus eximius*, work all the year. They

eat the buds. The flowers are put off, and when the fruit forms they pull the cherries off long before they are full grown.

As I write I can hear the young Sacred Kingfisher. They also, like so many birds, use the fowls' drinking vessels. The old Kookaburra gets pushed back by the Magpies. We notice the Magpies have learnt to stay out late, and so get those numerous brown beetles that come to the gum-trees in the evenings.

With the Wood-Swallows on their return this season was the White-shouldered Caterpillar-eater. First time we have noted it on our place, and, although I have only mentioned the birds immediately in the garden and at the doors, I want to mention the English Skylark, which we hear occasionally. The Black-faced Cuckoo-Shrike, an occasional Little Brown Hawk, a Grey Heron (Blue Crane), and Quail finish my garden list, which, I think, is very satisfying to anyone who is really fond of birds in their own surroundings. These I can see any day and at any time of day, and surely it is a great pleasure.—C. C. Currie, "Brandie Braes," Lardner, Gippsland, 4th January, 1924.

Some Eltham Birds.—One interesting event this season is the unusual number of White-shouldered Caterpillar-eaters, *Lalage tricolor*, that we are favoured with this season; it is quite a record year for them. Every paddock and hillside is enlivened by the rich trilling of the male birds, and they are nesting freely in the trees here. One pair have built their small nest in the fork of a horizontal branch of a Red Box close to the house, the male bird doing most, if not all, of the building, and he was not at all concerned at me watching his operations. The nest was completed and two eggs laid within the week ("Cup Week," 4th to 10th November), the male bird doing a good share of the sitting. Their nesting habits are interesting. In the morning one bird sits for about ten or fifteen minutes, and the other comes and relieves. If the female bird is rather long away the male goes after her and drives her on to the nest, quite domineering. Of these I have been fortunate in securing several good negatives. They are not shy of the camera facing them at twenty-six inches from the nest.

Those fine warblers of the bush, the two Whistlers, the Rufous-breasted, *Pachycephala rufiventris*, and the Golden-breasted, *P. pectoralis*, are making the gullies ring with their notes, the rufous species being very numerous.

Of northern visitors, the Black-faced Cuckoo-Shrike, *Graucalus melanops*, four species of Cuckoos, and the Olive-backed Oriole, *Mimetes sagittata*, are fairly plentiful this spring.

There are not many Wood-Swallows this season in comparison with last year, which was a record one in this district.

It was a wonderful sight on Hospital Sunday (28th October) and on several other occasions during October and November of last year to see large flocks of them darting after and feasting on the Bogong moths, of which we had an invasion. There must have been millions of them flying about the box-trees, which were in heavy bloom. A great many of the other insect-eating birds were also despatching the moths. Some of the Wood-Swallows, of which there were three species—the White-browed, *Artamus superciliosus*, the Masked, *A. personatus*, and the Sordid, *A. tenebrosus*—settled down to nest in the district, but the bulk of them disappeared after thinning out the "Bogongs."

Another northern visitor that came here last spring in numbers was the Australian Roller or Dollar-bird, *Eurystomus pacificus*. I believe that they nested about the creek, as on several occasions I observed young birds with the adults, but I have not seen or heard a single specimen of the genus this season so far.

Several Black Ducks, *Anas superciliosa*, were observed about the creek during the drought period of this year.

Painted Quail, *Turnix varia*, are fairly numerous about here at present. Some of them become quite tame, and come within a few yards of our back verandah.

The Grey Thrush, *Colluricincla harmonica*, Bronze-winged Pigeon, *Phaps chalcoptera*, Tree-creepers, Nuthatches, Tit-Warblers, about twelve or more species of Honey-eaters, White-winged Choughs, *Corcorax melanorhamphus*, and most of the other local birds are all busy with nesting cares now, some of them being later than usual.

I found, one day this week, an egg of the Pallid Cuckoo, *Cuculus inornatus*, in the nest of a pair of Goldfinches—an unusual occurrence—in one of our apricot trees, which is a favourite place for the finches to build. This is the second time that the occurrence has come under my observation.—W. C. Tonge, Eltham, 15th November, 1923.

[These notes have been held over for want of space.—Ed. *Vict. Nat.*]

Since sending last notes I have observed and identified several pairs of Painted Honey-eaters, *Entomophila picta*, which are mentioned in Leach's book as being very rare. I had often heard their distinctive notes before, but was not sure of the bird. One pair built their nest and reared two young birds in a hanging bough of a Red Box just a few yards from our back door, and they are still about the paddock. The nest was a very frail structure made of a few bent grasses over a couple of dead leaves, and from underneath it was hard to recognize as a nest. Unfortunately, I found the nest too late to obtain photographs of the birds. W. C. Tonge, Eltham, 12th January, 1924.

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The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria.

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Hon. Editor: F. G. A. BARNARD, Esq.

The Author of each article is responsible for the facts and opinions recorded.

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1924.

Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 10th MARCH, 1924.

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBERS—	PROPOSER.	SECONDER.
Mrs. Hannah Hassfield, 12 Jackson-street, St. Kilda.	Mr. F. Chapman, A.L.S.	Mr. J. A. Kershaw, F.E.S.
Mr. Leonard Allen, The Ridgeway, Ivanhoe.	Mr. L. Thorn.	Mr. C. Oke.
Mr. Ernest G. Woods, 8 Morang road, Hawthorn.	Mr. J. Searle.	Mr. F. G. A. Barnard.
AS COUNTRY MEMBER—		
Mr. E. Paul, 12 Virginia-street, Geelong.	Rev. W. C. Tippett.	Mr. C. Oke.

3. Nominations for Membership.

4. General Business.

5. Remarks by Exhibitors relative to their Specimens.

   Ten minutes' adjournment for discussion of Exhibits.

6. Reading of Paper and Discussion thereon.

   By Mr. C. Oke—"Notes from Natya."

   The committee will be pleased to receive promises of papers for future meetings.

7. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

   Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and *Naturalist*. Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Club year ended on 30th April last. Any subscriptions overdue should be forwarded to the Hon. Treasurer *at once*.

Subscriptions for 1923-4 should be paid to the Hon. Treasurer as early as possible.

The Hon. Treasurer requests that members who received tickets for sale for Wild flower Exhibition will settle for them as early as possible, so that the accounts may be closed.

APRIL MEETING.

It is intended to devote the April meeting (14th) to a display of objects under the microscopes. Members willing to assist will kindly give Mr. J. Searle particulars of what they can do.

The Victorian Naturalist.

Vol. XL.—No. 11. MARCH 6, 1924. No. 483.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday, 11th February, 1924.

The president, Mr. C. Daley, B.A., F.L.S., occupied the chair, and about sixty members and visitors were present.

REPORTS.

A report of the visit to the Zoological Gardens on Saturday, 19th January, was given by the president, who said that the large party of members had been conducted round the Gardens by the Director, Mr. A. Wilkie, to whom they were indebted for a very interesting afternoon.

On the motion of Messrs. Barnard and Lambert, a vote of thanks was unanimously directed to be sent to Mr. Wilkie for his kindness in acting as leader of the party.

A report of the Foundation Day excursion to Warburton on Saturday-Monday, 26th-28th January, was given by the leader, Mr. L. Thorn, who said that, owing to almost incessant rain, little opportunity occurred for doing field work. During a short period of sunshine the flowers of the Sweet Bursaria, *B. spinosa*, which was in full bloom along the river-bank, were searched for beetles, with moderate success. On the Monday the weather was slightly better, and during a short walk up the road towards Mount Donna Buang an uncommon species of "emerald" moth was taken, apparently benumbed by cold, on the flower of a Leek Orchid, *Microtis porrifolia*. Altogether, the excursion was very disappointing so far as collecting was concerned.

A report of the excursion to Eltham on Saturday, 9th February, was given by Mr. F. G. A. Barnard, who acted as leader in the unavoidable absence of Mr. A. D. Hardy, the leader for the day. Mr. Barnard said that the afternoon had turned out very pleasant. A fair number of members were present. The route taken was to the south-east of the township, where several species of eucalypts and other shrubs and plants were noted, none of which were of particular interest.

ELECTION OF MEMBERS.

On a ballot being taken, Miss E. C. Cameron, 87 Powlett-street, East Melbourne; Miss E. M. Haynes, "Eckersley," Plant-street, Malvern; Miss I. Morrison, "Baringa," College-parade, Kew; and Mr. Thomas Meldrum, "Persoonia," 380 Northcote-road, Armadale were duly elected ordinary members; and Mr. D. J. Maher, State-school, Newry, and Mr. John Elliott, Railway Station, Noojee, country members of the Club.

GENERAL BUSINESS.

The Chairman said that Mr. F. E. Wilson had consented to act as librarian for the present.

PAPERS READ.

1. By Mr. F. E. Wilson, entitled "Some Glimpses of Our Bush Birds."

This took the form of an illustrated lecture, in which the author gave some interesting notes about many of our familiar native birds. Some fine pictures of the Lyre-bird at home were greatly appreciated.

Mr. G. A. Keartland and the chairman expressed their pleasure at the beauty of the slides exhibited and the very instructive nature of the remarks regarding them.

2. By Mr. H. B. Williamson, F.L.S., entitled "Description of a New Genus of the Family Epacridaceæ."

The author said that during the Club excursion to the Brisbane Ranges (from Bacchus Marsh) on the 10th November last, amongst other flowers, he picked some specimens which at first glance appeared to be the Common Beard-Heath, *Leucopogon* (*Styphelia*) *virgatus*, R. Br., but on closer examination he found that they did not agree with any described genus of the Epacridaceæ, and, after search at the National Herbarium, &c., he had come to the conclusion that a new genus should be founded for it. He had therefore determined to set up the genus Choristemon for it, and had chosen the specific name of humilis, having reference to its lowly habit.

Mr. C. Oke congratulated the author on his interesting find, and the Club on the fact that it would be given to the world through the pages of its journal, the *Victorian Naturalist*.

NATURAL HISTORY NOTES.

Mr. C. Oke gave an account of a combat he had recently seen between a Greenhead Ant, *Chalcoponera metallica*, and a small spiderling, which had resulted in the death of both combatants.

Mr. A. J. Tadgell referred to his exhibit of the Alpine Leek Orchid, *Prasophyllum Suttonii*, Rogers and Lees, first described from the Buffalo Plateau in 1912. The specimen exhibited, when collected on Mount Bogong on 2nd January, showed no sign of flower buds, the leaf sheath being unbroken, but on the 5th February the plant had budded, and developed twelve large, perfect flowers, true to colour—clear white, with pale purplish-red markings and stripes.

EXHIBITS.

By Mr. F. G. A. Barnard.—Flowers of two Wattles, *Acacia retinodes* and *A. pruinosa*, now blooming in his garden at Kew.

By Mrs. Coleman.—Flowers of the orchid *Spiranthes australis*, Lindley, Austral Lady's Tresses, from Healesville—normal

spikes showing the spiral inflorescence in a single row, and abnormal blooms showing (*a*) inflorescence in a double spiral arrangement, and (*b*) spiral arrangement not clear –flowers in three rows.

By Miss G. Nethercote. –Conglomerate from Mount Reed, West Coast of Tasmania ; ore from Mount Lyell mine ; pyrites from North Mount Lyell ; slag from the smelters, and copper after leaving smelters, Mount Lyell, Tasmania.

By Geological Survey of Victoria, per Mr. A. E. Rodda.—Epiphysis of whale, found on beach near Darby River, National Park, Wilson's Promontory.

By Mr. A. E. Rodda.—Drone-fly and larvæ.

By Mr. W. H. A. Roger.—Aboriginal implements found on Gol Gol station, about 100 miles north-west of Balranald, N.S.W., consisting of eleven stone axes, two oval pounding stones, and one flat grinding stone used for grinding nardoo seeds, &c. The latter were found in the vicinity of aboriginal camping grounds, near large swamps, in which the Nardoo plant grows plentifully. The dishes in which the seeds were pounded were originally flat slabs of sandstone, measuring about two feet in length by ten or eleven inches in width, with a thickness of three inches. The constant pounding had worn away the surface to a depth of half to an inch and a half, so that the stone resembled a shallow dish. The aboriginals had died or left the district many years ago.

By Mr. J. Searle.—Some minute aquatic hymenopterous insects.

By Dr. C. Sutton.—Fresh flowers from Cradle Mountain, Tasmania including *Blandfordia marginata*, *Milligania longifolia*, *M. Lindoni*, *Olearia longifolia*, *Archeria serpillifolia*, *Boronia citriodora*, *B. rhomboidea*, *Olearia obcordata*, *O. persoonioides*, and *Bellendena montana* : with foliage of *Notofagus Cunninghami* and *Sphagnum cymbifolium*, and fungus, *Cyttaria Gunnii*.

By Mr. A. J. Tadgell.—Growing orchid in flower, *Prasophyllum Suttonii*, Alpine Leek Orchid, collected at Mount Bogong, January, 1924 ; *Prostanthera* (?) *incisa*, from the Bogong district (further specimens required for complete identification) ; *Veronica arvensis* (introduced), from Bogong district (uncommon) ; Bristly Cloak Fern, *Notholæna* (*Cheilanthes*) *distans*, R. Br., from Keilor, a new district (S.), previously recorded only from E., "Snowy," and, for comparison, the closely-allied common Rock Fern, *Cheilanthes tenuifolia*, Burm., S.W.

By Mr. L. Thorn.—Specimens illustrating the life-history of the Mistletoe Blue Butterfly, *Ogyris olane*.

By Mr. J. Wilcox.—Flowering branches of the New South Wales Christmas Bush, *Ceratopetalum gummiferum*, grown at East Camberwell.

After the usual conversazione the meeting terminated.

EXCURSION TO THE NATIONAL PARK, WILSON'S PROMONTORY.

By CHAS. DALEY, B.A., F.L.S.

THE connection of the Club with the establishment of the National Park is set out at length from time to time in the pages of the *Victorian Naturalist*, especially in the late Dr. T. S. Hall's historical account in January, 1905 (vol. xxi., p. 128), and in the reports of subsequent Club excursions dealing with the topography, natural features, the flora, and fauna of the Promontory, two of which are illustrated, and a map appeared in vol. xxii. These are listed in the *Naturalist* for January, 1920 (vol. xxxvi., p. 131). The last Club excursion took place in December, 1914, at a time when everyone was excited by the Great War, then in its infancy. Its long duration, and the subsequent aftermath, led to the National Park excursion being held over for some years.

The recent excursion (the fourth), however, differs in some respects from the previous ones, inasmuch as, on this occasion, owing to the erection of the Chalet by the trustees of the Park, facilities were available for the first time for comfortable accommodation without preliminary arrangements for camping and provisions. This also allowed of ladies taking part in the excursion without any great discomfort. Owing to insufficient accommodation for a large party, with great reluctance I had to notify several members who were desirous of going, but had not given early intimation of their intention, that the party must be limited to sixteen, who were as follow:—Mrs. Shiels, Miss R. E. Chisholm, Miss E. M. Haynes, Miss Morrison, Mr. and Mrs. L. Hodgson, Mr. and Mrs. V. Miller, Messrs. E. Cox, C. Daley (leader), H. B. Daley, V. Gray, A. E. Keep, H. M'Coll, C. R. Ralph, and L. Thorn.

Leaving Melbourne on Wednesday, 26th December (Boxing Day), by the 7.20 train for Bennison (110 miles), on the South-Eastern line, an uneventful journey was made, the chief feature noticeable being the tremendous denudation of heavily-timbered country along the route, bare hills and slopes being everywhere the rule. Owing to the falling of rain, the heavily-laden train was unable to make good progress up the slippery rails on several steep gradients, with the result that we arrived an hour late at Bennison. Transferring our luggage to the unique horse-tram—"the fish express"—we soon reached Port Franklin, only to find that the hour's delay had lost us the tide, and we must wait for the morrow before proceeding to the Vereker Landing, at the south-west corner of the Inlet. There is no accommodation house at the fishing village, and it was not until after much uncertainty and inquiry that we all got

put up for the night, Mr. Cripps, our boatman, and his brother, formerly ranger at the Promontory, kindly interesting themselves to provide comfortable quarters.

Port Franklin, a thriving fishing village, is on the high bank of the Franklin River overlooking the far-spreading mud flats on which, when the tide is low, thousands of small crabs scuttle and wild-fowl feed. Further out, "the mangrove sleeps upon the sea," and lines the river banks and flats with its sombre foliage. After tea some of us, in taking a walk along a bush road, came upon a full-grown Koala at the top of a gum-tree, its actions and appearance arousing considerable interest. Further on our attention was directed to the unusual sight of three Podargi, which, perched on a bough, in their immovability and colouring gave an effective exhibition of protective mimicry, being practically unrecognizable from the branch on which they sat.

On Thursday morning the party, with an addition of three others, left at 10.30 a.m., and, passing down the Franklin River into the Inlet, soon had a fine view of the Promontory in bold relief, with Snake Island on the east. Flocks of swans in flight and at rest were seen along the course. Passing Doughboy Island, a granite outlier of some size, a picnic party was seen on the southern side. Nearing the landing-place at the foot of the Vereker Range, smaller masses of granite rocks stand out from the sandy coast, their close resemblance to old haystacks into which the cattle had made inroads being very marked. One almost expected to see some "swain responsive as the milkmaid sung" appear in the distance. A vehicle took off the luggage of the nineteen passengers, and, after a preliminary cup of tea at the Rest House, our party started to walk across to the Chalet, six and a half miles distant.

The track offers no difficulty, at first passing for some distance through a well-grown grove, chiefly of the Saw Banksia, *B. serrata*, much frequented by Funereal Cockatoos, Wattlebirds, and Pennant Parrots. The strong timber fence, about eight feet in height, has several parallel rows of barbed wire above, making either ingress or egress in connection with the park difficult. Passing out at the first gate, we went over heathy land, skirting a swamp. Here were gathered the Long Purple Flag, *Patersonia longiscapa*, and also the white Butterfly Flag, *Diplarrhena morœa*. In very late flowering were also seen Early Nancy *Anguillaria dioica*, Milkmaids, *Burchardia umbellata*, and the Bulbine Lily, *B. bulbosa*, whilst the Common Correa, *C. speciosa*, the Yellow Hakea, and the Scented Paperbark, *Melaleuca squarrosa*, all dwarfish in habit, were in bloom. A single spike of the Hyacinth Orchid, *Dipodium punctatum*,

was in bud, and also the Pale Leek Orchid, *Prasophyllum patens*, was gathered.

The latter part of the journey leads over or round the sand-dunes, here covered with a fairly dense growth of tea-tree and Sheoaks, *Casuarina stricta*, after which is the descent to the Derby River and the bridge, from which the Chalet is barely half a mile distant. Owing to four members of the Tourists' and Walkers' Club having to be accommodated, also a party of three persons from Welshpool, and the three members of the Council who arrived that evening, eight of the male members of our party had perforce to sleep at the original Rest House for the time being.

On Friday morning, after breakfast, a visit was made to the hill behind the Chalet, the steep track being followed to the summit, from which, amid the granite boulders, a splendid view of the coastal scenery, with its bays and islands, from Shellback to the Anser Group, was obtainable; then a descent was made to the beach at the mouth of the Derby River. Amid the scrub vegetation on the hill, mostly stunted Coast Tea-tree, *Leptospermum lævigatum*, there occurred in flower White Correa, *C. alba*, Sea Box, *Gynopogon* (*Alyxia*) *buxifolius*, the Scented Paper-bark, *Melaleuca squarrosa*, the Narrow-leaved Acacia, *A. linearis*. The pretty Paper-flower, *Thomasia petalocalyx*, the Horny Cone-bush, *Isopogon ceratophyllus*, Common Correa, *C. speciosa*, the Hop Goodenia, *G. ovata*, several species of Olearias, Golden and White Everlastings, *Helichrysum leucopsidium* especially; the Love Creeper, *Comesperma volubile*, and the erect species, *C. ericinum*, were also in bloom. On the rougher sea-front of this ridge grew some splendid specimens of the Cushion-bush, *Calocephalus Browni*, one of which was fully eight feet in diameter. On the wind-blown sand the Hairy Spinifex, *S. hirsutus*, grew well. Returning after reaching the beach, along the margin of the river, the Bidgee-widgee, *Acæna sanguisorba*, was in adhesive fruit, whilst the Purple Swainsona, *S. lessertifolia*, and Cut-leaf Cranesbill, *Geranium dissectum*, three species of Lobelia, and the Scented Fan-flower, *Scævola suaveolens*, were blooming freely. In the afternoon Tongue Point was visited by the track skirting the coast, fine clumps of Casuarinas, Native Cherries, *Exocarpos stricta* (in fruit), Coast Beard Heath, *L. Richei*, the Sea Box, and Tea-tree giving shade and shelter until the open, heathy spaces with dwarfed vegetation are reached on this exposed Promontory, where the incessant and tremendous effects of wind and wave on the huge granite masses are very noticeable.

An early start was made on Saturday for an excursion to Tidal River and Norman Bay. The route passes the Darby

Swamp, or marsh, with its dense selvage of Tea-tree; then through a fine clump of *Banksia serrata*, over steep hills and vales in a southerly direction. Heathy vegetation clothes the slopes, amid which the Grass-trees, *Xanthorrhœa minor* and *X. australis*, grow, the former profusely, and the Common Fringe Myrtle, *Calytrix tetragona*, and the Dagger Hakea, *H. pugioniformis*, were in flower. About three miles on the track the first glimpse of the ocean reveals a splendid view down a sheltered valley: the line of white sand, the granite rocks, the breaking waves, and the islands beyond in the blue waters presenting a beautiful picture. At Whisky Creek the cool, pure water issuing from the granite hills provided a welcome draught. From this little creek, with its protecting verdurous covering, we passed to open undulating heath country, where the dwarf growth and the soft sand witnessed to the power of the prevailing westerly wind. In springtime this heath land is rich in flowers. After going six miles we diverted our course to the seashore, at Leonard Bay, into which a small tidal stream flows. The features of these bays are headlands of bold granite rocks on each side, water-worn boulders, caves, and passages at their base, a streamlet of wine-coloured water from the hills, and the beautiful, fine curved beaches of soft white sand extending between the rugged points. Another feature of the coast is the flotsam and jetsam driven in on the current which strikes the western shore. Here the time was pleasantly spent until, after a refreshing bathe, it was time to return.

Sunday was a free day, spent, for the most part, in reading, bathing, or in short walks. In the afternoon most of the party made an excursion along the timbered ridges towards the south through the fine Sheoak groves and exposed masses of granite. From here the destruction of eucalypts by the Koalas two or three years ago was noticeable, the leaves of the species *E. globulus, obliqua,* and *Gunnii* being eaten until the trees died, and, as a consequence, a great number of the bears also.

On Monday a visit was made past the Derby River mouth to the cliffs and kitchen middens which are a feature of this part of the coast. The sandstone cliffs, weathered and worn into fantastic forms and shapes, are very interesting. They show good examples of current bedding on the top are worn into fantastic caves, and over their ragged edges here and there falls perpendicularly a shower of fine sand, in the manner of a waterfall. Sometimes the sand appears to blow up as from a vent before falling outwards. Dune limestone is exposed in some places on the shore. Along this coast, right up to Fish Creek and beyond, the aborigines roamed and found abundant food in the adjacent sea. Their middens were generally in a place sheltered from the wind. Here they feasted on shell-fish,

the remains of Turbo, Patella, Mytilus, Haliotis, &c., being numerous, whilst bones of animals are found also. With the action of the wind the middens may be covered over or laid bare, revealing characteristic evidences of the stone age in which the blacks lived. Occasionally a stone axe, grinding, or hammer-stone may be found, and chips of quartz or of flint are obtainable. These, from the nature of the materials, show little evidence of definite workmanship, the quartz being easily obtainable from the disintegrated granite in angular fragments suitable for immediate use, whilst any chip from a flint has a cutting edge, hardly needing secondary working. The flint was obtainable from nodules encrusted with calcareous matter, which, as at Torquay, Cape Wollomai, and elsewhere, are washed in from the sea, and from which the chips were struck off as required.

On New Year's Eve two of our party and the members of the Walkers' Club left for Melbourne, and by common consent, after some community singing, we decided to see the old year out at 10.30 instead of 12 p.m., when we sang the National Anthem and "Auld Lang Syne," made the usual felicitations, and went to bed.

Next morning (Tuesday, 1st January) quite a varied procession left the Chalet at 9 a.m. for the trip to Sealers' Cove. As the whole of our party could not go, Messrs. Kershaw, Thorne, and Peveril very kindly arranged to take the ladies to Lilly-pilly Gully, a typical fern gully, Messrs. Cox and Miller also going, whilst six others went with a pack-horse to Sealers' Cove. For about six miles we journeyed together, four horses having been supplied for the convenience of the ladies. The track was the same as to Tidal River, then turned eastward through the open, heathy rises, where the Lilly-pilly track branched off, and the Sealers' Cove party followed the telegraph line, passing about half a mile further on through the morass where the Tidal River makes its way to Norman Bay. The vegetation was very dense on the rich peaty soil, Leptospermum, Melaleuca, many species of reeds, Scirpus, and swamp-grasses assisting to make the scrub almost impenetrable. The Golden Spray, *Viminaria denudata*, was in flower, also the Purple Bladderwort, *Utricularia dichotoma*, the Ivy-leaf and the Purple Violets, the Forked Drosera, *D. binata*, with attractive white flowers. The Bluebell, *Wahlenbergia gracilis*, and the Blue Pincushion, *Brunonia australis*, were occasionally seen. Reed-Warblers could be heard in full song. Other birds seen in crossing the heath were the Pennant Parrots, Spur-winged Plovers, and some Cormorants. Very small Mountain Trout, Galaxias, were in the stream, in which one would naturally expect to find Blackfish.

Leaving the marshy area, the track gradually rises at the base of granite slopes until the foot of the Bad Saddle is reached. Here the gradient is very steep, the granite very much disintegrated on the surface, showing tourmaline very freely, and the track is worn down and broken by water action into channels, making the ascent difficult. "Bad" Saddle was so obviously a term of flattery that we wondered at the namer's poor command of English adjectives. Leaving the Bad Saddle for better or worse, we turned eastward and followed a well-graded, stony track cut out of the hillsides above the valley of Titania Creek far below. The sun's rays were reflected from the hills, making the track hot, and the water-soaks were here also below. We were glad at last to reach a spot where, with a little patience, we could get a few billies of water above a steep fern gully just below the track. After lunch and a rest, resuming our journey, we found more shade from the sun, and generally improved conditions for walking. Passing between Mount Ramsay and the Mount Wilson Range, we reached the saddle from which the long descent to Sealers' Cove is made. The difference between the western slope and the eastern is very marked. The former was dry, and vegetation somewhat sparse; ferns almost absent. The eastern side was well shaded, plentiful streamlets crossed the path, which was soft and cool to the tread, whilst the vegetation was tropical in its luxuriance. Stately tree ferns, Dicksonias, Alsophilas, and Cyatheas, above the smaller ferns Doodias, Blechnums, Gleichenias, Todeas, Polypodiums, &c. The characteristic trees of Gippsland or the Dandenong fern gullies grew closely together down the slopes -Blackwood, Lilly-pilly, Hazel, Myrtle Beech, Musk, Blanket-wood, Sassafras, Native Mulberry, &c., in great profusion and growth. *Acacia verticillata* and the Sweet Bursaria, *B. spinosa*, have here much softer and more succulent foliage than I have seen elsewhere, and the Common Heath, *Epacris impressa*, quite profuse foliage and a shrubby appearance. On the moist track grew many seedlings, and on the trunks of the tree-ferns, and on fallen limbs, &c., epiphytal ferns, mosses, and lichens grew luxuriantly. The dead trunks of enormous gum-trees, probably *Eucalyptus amygdalina*, towered above the green vegetation. The Sword-grass, Lepidosperma, along the track was very rank, some leaves reaching ten feet in length, forming, where not cut, an obstacle to progress. Crossing the rough bridge over Sealers' Creek, we soon picked a site and erected the tent. After it had been put in order we found that we had encroached on the claim of a nest of bull-ants, who, until disposed of by Mr. Thorne, were very active. Precautions taken were effective, no retaliatory measures being taken.

Sealers' Cove is beautifully situated. It is somewhat oval in shape, like the letter C, the amphitheatre of mountains and hills enclosing the well-watered and profusely-timbered valleys stretching down to it ending in a prominent hill of considerable height on each side of the entrance. It is thus effectually protected from the westerly winds, and also from the southerly and south-easterly blasts. Thus favourably sheltered, it forms a haven in time of tempest which intercolonial vessels have frequently sought when hard beset. Vegetation comes close to the beach. The shore is of that soft, white, musical sand characteristic of the Promontory. The tide comes in with a distinctly tired feeling about it, and, without breaking, "flops" upon the beach. In its quiet waters shells are numerous. No mangroves were noted, conditions being unfavourable for growth. Sealers' Creek enters on the southern side of the cove with a considerable volume of water. From point to point around the beach would be about one mile and a half. Rising early, we followed the shore around to the outlying rocks towards the northern end. There was little life of any kind to be seen, Terns and Gulls being the only creatures visible. We saw fresh tracks of a large Kangaroo on the sand, and also those of a prowling fox.

Our stay was necessarily short, and we were agreed that on another occasion a camp of several days' duration would, from a collector's standpoint, be worth consideration.

Next morning, at 10.30 a.m., after a refreshing bathe, we started on the return journey, and traversed the long up-grade through the delightful fern-clad valleys and hill slopes until we crossed to the western side. On the track several large spikes of the Sun Orchids, *Thelymitra aristata* and *T. longifolia*, were gathered. About a mile from the Bad Saddle we saw a Koala which, startled by the attention it received, in springing from one tree to another, miscalculated, and came to the ground. Mr. Hodgson captured it and carried it as far as Titania Creek, where it patiently hung by its fore-paws to the top of a post. When placed on a tree at our departure it climbed rapidly to the top, crying and calling out piteously. In Titania Creek we noticed many small Galaxia Trout. After lunch we resumed our journey over the marshy country to Tidal River and the stretches of heath, where several Whistling Moths attracted our notice, Mr. Thorne obtaining several specimens. A lone sentinel on a distant hill proved to be Mr. Kershaw. On arrival at Whisky Creek we were pleasantly surprised to find that some of the ladies had come that distance to prepare afternoon tea—a kindly and thoughtful act for which we were very grateful. We reached the Chalet at 7 p.m., a misty rain falling on the way.

Thursday morning saw us early astir, leaving the Chalet at 6 a.m. to walk across to the Corner, horses being kindly placed at the services of the ladies when tired of walking. The boat and the tide alike awaited us, and with a freshening breeze we had a most enjoyable run up to Port Franklin, returning to Melbourne by the slow-moving train leaving Bennison at 1.20 p.m.

A few general remarks might be made in regard to the National Park. We were rather disappointed at seeing so few animals. Black-backed Wallabies were seen on several occasions, and appear to be on the increase. No Kangaroos were observed; probably the eastern side of the Promontory, with its sheltered forest country, would be more favourable for them. Over two years ago, on a visit to the Vereker Range, I saw at least half a dozen Kangaroos. Of course, a small party has a better chance for observation than a large one. Foxes and rabbits have, unfortunately, obtained a footing, and may yet prove a nuisance, as elsewhere. Wild-fowl were not numerous, rivers and swamps away north being well provided with water. It is in dry seasons that numbers come south. Bird-life was abundant in the scrubs and along the Darby River, the vocal chorus, especially at dawn, being varied and tuneful, many unfamiliar notes being heard. On the track to the Cove there appeared to be signs of the Lyre-birds scratching, but none were seen or heard in this suitable environment. The Wonga and the Bronze-winged Pigeon should do well on the Promontory. Probably the latter is found here. Emus have become well established, and were seen in the neighbourhood of the Chalet. A few small snakes of the Copperhead species, *Denisonia superba*, were seen, and the tracks of a large snake were seen several times crossing the sandy road by the Derby River. One or two Blue-tongued Lizards basked listlessly in the sun. While resting, a small lizard, *Egernia whitii*, gave an interesting exhibition of fly-catching, using Mr. Gray's outstretched form as a field of operations. Its agility was very great, and it showed no fear of being handled. This species of small lizard was numerous. Insect-life was abundant, some fine Jewel Beetles, Buprestidæ, being obtained.

There is a remarkable uniformity in the granitic formation which, with the sands, gravels, and clays derived therefrom, constitute the Promontory. The granite contains very large crystals of quartz and orthoclase felspar, which, on the western coast, stand out very prominently under the effect of weathering. Near Oberon Bay the crystallization is said to be finer, almandine garnets occurring. Muscovite and biotite are both found in the composition of the granite, and tourmaline is

common. At Scalers' Cove at one place the sand was coarse and crystalline, and it is not unlikely that gem stones might occur on the eastern ranges, especially to the north-east, where prospecting for tin has been carried on intermittently. I was assured by a man familiar with that region that he had frequently washed off with a dish in the gullies fine samples of stream tin.

There is a great variety of vegetation on the Promontory. No plant was seen that is not already on record. Owing to destruction by fire, by native bears, and also by human agencies in earlier periods, eucalypts are not very numerous, although, judging by the gaunt, grey trunks stretching their leafless arms to the sky on many of the ranges, at one time the forests must have been extensive. On the eastern slope, protection from the western winds and currents, a more favourable aspect, and probably moister and warmer conditions, account for the luxuriant vegetation as compared with that on the wind-swept and exposed western slope. The Austral Cabbage Palm, *Livistona australis*, from Gippsland, planted at Lilly-pilly Gully and elsewhere, is flourishing. The Kanooka, *Tristania laurina*, the Gum Myrtle, *Ingophora intermedia*, and the Mahogany Gum, *Eucalyptus botryoides*, would probably thrive at Scalers' Cove if planted; perhaps also the Bloodwood, *E. corymbosa*, and the Currajong, *Brachychiton populneus*, for conditions for growth seem similar.

When the proposed road from Fish Creek or Foster is made through the isthmus, the Promontory will be more attractive to tourists, if less so to lovers of Nature who appreciate the free, open life of its solitary spaces.

Mrs. Weston, lessee of the Chalet, did everything possible to make our party comfortable, and opportunity must be taken to express our appreciation of the kindly advice, assistance, and consideration of Mr. J. Kershaw and his *confreres*, Messrs. Thorn and Peveril, tending to make our visit enjoyable and interesting. A fine feeling of *camaraderie* amongst the members and harmonious co-operation ensured the success of the excursion.

THE KOOKABURRA AS A FISHER.—In connection with this bird, Mr. Fisher adds that "the Great Kingfisher" is a more persistent fisher than is generally realized. He has seen as many as thirty small English perch brought to one nest in an afternoon as food for the young. About the city many instances have been known in which goldfish ponds in a garden have been quite cleared out before the owners discovered that the thieves were early morning "Jacks."

BUTTERFLY COLLECTING IN NORTHERN NEW SOUTH WALES AND SOUTHERN QUEENSLAND.

By A. N. BURNS and L. B. THORN.

(*Read before the Field Naturalists' Club of Victoria, 12th Nov.*, 1923.)

HAVING received a letter from Mr. G. A. Waterhouse, F.E.S., of Sydney, intimating that he was going up to the Richmond River on an entomological excursion in September of last year, we made arrangements to accompany him, and on Wednesday, 20th September, boarded the Sydney express as the commencement of the trip, arriving in Sydney the next day, tired after all the excitement of the previous day's packing up and the long and continued din of the train journey.

In Sydney we had a couple of days in which to rest, but on the Friday found ourselves eager to get out into the bush, so took the day out to Narrabeen. This is one of the most delightful trips around Sydney, and affords one an opportunity of seeing one of the finest parts of the harbour—that between Sydney and Manly. Then there is a tram run of about eight miles, through fine collecting country. At Narrabeen itself the general aspect of the country is different. There we have shale formation, and consequently the fauna and flora are different to that on the sandstone which surrounds Sydney and suburbs. The day being fine and warm, there were many species of insects on the wing. We devoted our attentions to moths and butterflies (Lepidoptera), also Hymenoptera (wasps and ants), and were successful in securing among our captures some fine specimens of one of our early Satyrids, *Argynnina hobartia cyrila*, Nor. This butterfly ranges from Tasmania to Sydney, and specimens from the mainland differ considerably from Tasmanian examples. It is also interesting to note that specimens from Narrabeen were much larger and even brighter than specimens taken in Southern New South Wales and Victoria. The well-known Wanderer Butterfly, *Danaida archippus*, Fab., was exceedingly plentiful, and numbers of its larvæ were observed on the food plant, the White Cotton or Milk-weed, *Gomphocarpus fruticosus*. Several species of parasitic wasps, Ichneumonidae, were taken, also one fine Braconid, also parasitic on larvae, and specimens representing some four other groups were also secured. One showy species of beetle belonging to the family Chrysomelidae was exceedingly abundant on the young shoots of the Sweet Bursaria, *Bursaria spinosa*. We decided to leave for Sydney early in the afternoon, as we were anxious to set our captures before packing our setting cases for the journey northward.

On Saturday evening we met our friend Mr. Waterhouse, and at 6 p.m. boarded the North Coast Steamship Co.'s s.s.

Burringbar. The trip on the boat was delightful, and on the Sunday we found ourselves watching the porpoises sporting in the water, and numerous sea birds—including at one time fourteen Albatrosses—following the wake of the steamer. We also found great interest in locating and identifying the various bays and coastal features from a map that Mr. Waterhouse had brought with him. Daybreak on Monday found us drawing up to the pier at Byron Bay, the most easterly point of Australia, and ere long we were being swung ashore in a basket. Lying on the beach, and embedded firmly in the sand, was the wreck of the *Wollongbar*, which broke her moorings some eighteen months previously owing to the very heavy sea, and before her engines could be started she had drifted on to the beach.

We breakfasted at Byron Bay, and at 8 o'clock caught the train to Bangalow, a distance of eight miles. The scenery on this part of the journey was very fine, and all new to us. Impenetrable thickets of lantana bordered the palm and scrub patches, also the banana plantations, and huge fig-trees festooned with climbing vines and ferns towered to a height of over a hundred feet. On one occasion we observed a very large flock of Straw-necked Ibises feeding in a swamp, and heard the calls of many water-birds quite new to us. Arriving at Bangalow, we still had 17 miles to go ere we completed the journey; this was done by car, and took us past fine fields of sugar-cane, banana and pineapple plantations, and here and there patches of scrub and lantana. The weather was very fine and warm, and encouraged our hopes of having good success throughout the trip. At 10 a.m. we found ourselves at the Commercial Hotel, Ballina, at the mouth of the Richmond River, and our destination. We were not long getting our luggage to our rooms and getting changed, so as to have a look round before lunch. We secured several species of Hesperidæ (Skipper Butterflies) on the lantana flowers, and observed other species, which we obtained later. In the afternoon we went to Fishery Creek, about one and a half miles distant. There was a fine patch of scrub, and we had not to wait long ere we saw, flying high amongst the tree-tops, a male specimen of the glorious Bird-wing Butterfly, *Troides priamus richmondius*—the latter name being to signify the most southern limit of the Troides, or bird-wing butterflies. This was a sight never to be forgotten, and one we had long looked forward to seeing.

The next day found us up early, and a friend of Mr. Waterhouse's, a Mr. Robinson, of Rous, some fifteen miles distant, also a keen entomologist, called with his car to take us to some of the best collecting spots round Ballina. One patch we visited

in the afternoon, on the North Creek road, some five miles from the town, proved very productive, and on frequent visits paid there afterwards turned out to be the finest spot in the district. There we secured fine specimens of the showy Troides, also *Papilio aegeus*, *P. anactus*, *P. lycaon*, and the beautiful Kite Papilio, *P. leosthenes*, and there we also saw the Glassy Swallowtail Butterfly, *Eurycus cressida cressida*, and later secured a specimen at another patch. Butterflies of the family Nymphalidae were not so plentiful; two common and familiar Victorian species were met with—namely, *Pyrameis itea* and *P. cardui kershawi*. We also observed the fine large-tailed Nymphalid, *Eulepis pyrrhus sempronius*, and several other representatives of the Nymphalidae. Blues, or Lycaenids, were not numerous in species, but fairly so in individuals. Whites, or Pierids, were well represented. Satyrids, or Forest Butterflies, were represented by four species; and, lastly, the Skippers, or Hesperidae, contributed some fourteen or fifteen species. The scrub at the North Creek road patch was very dense, consisting chiefly of large figs festooned with creepers and the well-known lawyer vine, and fine large specimens of the Stinging-tree; in some cases this grew to a height of about 50 feet. Gigantic Bird-nest Ferns and Stag and Elk Horns, also orchids, were numerous on the branches and trunks of the larger trees. At the back of this patch was a grove of Bangalow Palms, *Archontophœnix cunninghamiana*, in a swamp; some of these were up to 60 feet high, and covered with a species of wild Convolvulus and wild Wisteria, both species were flowering. The scrub, as a whole, was bordered with the lantana bushes, on whose flowers the butterflies used to feed, so we were able to do the best part of our collecting on the fringes of the scrub. The large Troidis butterfly could be most easily secured in the early morning, when it came down within easy access of the net to feed on the lantana flowers. A very successful method we adopted for securing these butterflies was to take pieces of crimson flannel and put them on the bushes; the butterflies flew down near this, probably believing it to be a red flower, and so, by the use of a long stick to the nets, we secured a good series of specimens.

As we wished to see as much variety of country in which to collect, we took several trips to the South Beach, which was reached by taking a motor launch across the river. This was typical heath country, Leptospermum, Banksias, and other typical coastal plants growing in great profusion. We secured species there that we did not observe at the scrub patches, and on the flowering bushes, mostly Leptospermum, secured many fine species of Hymenoptera, seven species of Buprestid or Jewel Beetles, some fine flies (Diptera), besides about 100 species

of moths. Snakes were very numerous. Turning over one log we disturbed three, of which we killed two, and on each visit to South Beach always saw several. Large Goannas and lizards of many species were also abundant. A day's collecting at this spot could always be well ended by going out on to the stone breakwater, where rock oysters were very plentiful, and on several occasions we ended a perfect day's collecting by visiting this spot with screwdrivers.

Up to this time we had spent about ten days at Ballina, when Mr. Waterhouse, whose chief aim on the trip was to secure larvæ, pupæ, and perfect specimens of *Tisiphone abeona*, form *morrisi*, one of the Satyrids, was unable to secure all he required, so unfortunately he decided to leave us and go to Urunga, at the mouth of the Bellinger River, some 160 miles south, where that species also occurs, though limited in its range between Urunga and the Richmond River. Mr. Waterhouse is engaged on research work crossing certain forms of the Tisiphone butterflies, and was fortunate in securing, at Urunga, almost as many specimens as he required for his experiment. We had searched most of the swampy places near Ballina previous to Mr. Waterhouse's departure for this butterfly, but with little success, and about a couple of days later found a fine swamp of Sword-grass, Gahnia, on which the butterfly feeds, at the South Beach, where the butterflies were flying plentifully. A search of the Sword-grass plants for larvæ or pupæ, however, proved unsuccessful. Another locality we also visited was the cutting at Alstonville, some ten miles from Ballina. To reach this spot we took the Lismore service car at 8 a.m., and arranged for them to pick us up on the roadside on the return trip at 5.30 p.m. On the first occasion, however, the car driver did not remember to stop for us, so we were left to walk the ten miles to Ballina, which prospect we certainly did not relish, having tramped about twelve miles during the day. We, however, trudged on, and had gone about seven miles when we were picked up and given a buggy ride to our destination, and was probably, if not, the most enjoyable buggy trip we ever had. We paid Alstonville three more visits, but made quite certain each time afterwards not to be left to walk home again. We were very interested collecting at this place, for we secured several life-histories there, and one or two species of moths that we did not see elsewhere. We saw also the largest snake seen on the trip, just as we were preparing to return to Ballina. It crawled out from the thicket of lantana and coiled itself up on some flat rocks near a watercourse. This gave us a grand opportunity of seeing a fine specimen of the Carpet Snake, measuring fully eleven feet in length. At this same spot we also observed several very large Black Snakes and one green Tree Snake.

Our evenings at the hotel were always fully occupied. We had our setting boards in travelling cases with us, so were able to set up and label each day's captures—a method much preferable from taking home unset specimens and then having to relax them again for setting. Several visitors at the hotel were keenly interested in our work, and requested us to explain the methods employed in capturing specimens, &c., which we gladly did, and were rewarded by having quite a number of specimens brought to us nearly every evening.

We had now spent three weeks at Ballina, so decided to leave next day (Tuesday, 16th October); at 6.30 a.m. we were all packed up ready to go on to Brisbane. We had to re-car back to Bangalow, then train to Murwillumbah, on the Tweed River. This was a glorious spot, with beautiful river and palm scrub scenes amid fields of sugar-cane, bananas, &c. Behind the town of Murwillumbah rises up Mount Warning, a lofty, abrupt peak rising above the surrounding ranges, the summit of which was intermittently enveloped in cloud, and gave beautiful reflections in the calm water of the Tweed River. The next stage, and perhaps the most beautiful, was the twenty-mile boat trip from Murwillumbah to Tweed Heads. A winding passage through islands of tropical jungles, and wonderful cloud effects amid the surrounding mountains, afforded us a memorable sight, not to be forgotten. We passed the sugar-crushing mills and numerous river steamers towing barges of sugar-cane to the mill. Nearing our destination, we were aroused by hearing the captain call out that there was a large snake on a log, and, on looking towards the spot indicated, observed a large Carpet Snake, equal in proportions to the one we saw at the cutting at Alstonville. Tweed Heads being reached about 2 p.m., we had our luggage conveyed to the railway station, where we boarded the train to Brisbane. The Queensland trains appeared very diminutive to us, the gauge being 3 feet 6 inches. The scenery between Tweed Heads and Brisbane was totally different from that at Ballina or Murwillumbah. Vast Melaleuca swamps and eucalypt forests took the place of the scrubs, and we were particularly struck by the number of trestle-bridges and deep gullies over which the line was constructed. We reached Brisbane at 7 p.m., thoroughly tired out, so our first thought was to find accommodation for the night and get a good sleep, so as to be fresh for next day.

Our first and second days in Brisbane were spent in visiting entomologists there, and also in visiting the Museum, Gardens, and University. On the evening of the second day—Thursday—we left Brisbane by the 5 p.m. train for Palmwoods, 60 miles north, on the Gympie line, and arrived at our destination at

9 p.m. We secured accommodation at the hotel, and next morning found us up early, ready to walk to Montville, at the top of the Blackall Ranges. The day was very hot and trying, but we steadily kept on, and about lunch-time reached the summit, where we intended to do some collecting. We secured several species of butterflies and moths not taken by us at Ballina, and on walking round soon found ourselves talking to a resident, who was working in his orange grove. He kindly offered us oranges, which we gladly accepted, and showed us the damage that was wrought by the fruit fly, orange bug, and green grasshopper to the orange trees, and also gave us permission to collect any specimens we might like in and about the orchard. We observed there the species of Swallowtail Butterflies that are orange feeders—*Papilio aegeus*, *P. anactus*, and *P. sthenelus*. Of the former species we secured larvæ and pupæ on the trees. We then commenced to retrace our steps, and reached the hotel at about 6 p.m., tired out after the day's climbing.

Next day we decided to follow the Buderim Mountain tram line, the gauge of which is 2 feet 6 inches, and reminded us very much of the narrow-gauge railway from Ferntree Gully to Gembrook. We did not go far along this track before we came across large numbers of a butterfly we were most anxious to secure. This was another form of the group on which Mr. Waterhouse is working -*Tisiphone abeona rawnsleyi*; so we decided to take a long series of it, as we knew it would be of considerable value to have a supply of perfect specimens. The third and our last day at Palmwoods was occupied in rambling round Palmwoods township. We secured more *rawnsleyi* and several other species not before taken by us. The palm groves in this district were even finer than those seen on the Tweed or Richmond Rivers, and looked particularly fine with the large forest trees in the background. That evening the return to Brisbane was made, and we arrived there about 9.30 p.m.

Next day we visited One Tree Hill, four miles out of Brisbane, and there did some fine collecting. We secured a fine series of the Glassy Swallowtail Butterfly, *Eurycus cressida cressida*, and the life-history and a female specimen of one of the largest and most beautiful Australian Lycaenids, *Ogyris zozine zozine*, Hew. The larvæ and pupæ of this butterfly are found at the base of eucalypts bearing mistletoe, Loranthus, and are always attended by ants—one of the sugar species, or Campanotinæ. It is interesting to note these larvæ feed by night on mistletoe, and hide by day at the base of the host tree, the attendance by ants being due to the fact that the larvæ secrete a saccharine substance from two glands situated at the posterior end of the

body. This life-history, including many others taken on the trip, was also handed to Mr. Waterhouse as we passed through Sydney on the return trip, to be figured in his new book on the life-histories of Australian butterflies.

The next morning, at 7.45 a.m., we left Brisbane on the commencement of the return journey, and travelled *via* Tweed Heads, the only alteration made being that we took the motor service car from Tweed Heads to Murwillumbah instead of the steamer, so we were able to replenish our memories with the glorious scenery we had passed through a week previously. We left Murwillumbah about 3 p.m., reaching Byron Bay at 5.30 p.m., and, after having tea there, boarded the s.s. *Orara* at 7 p.m. Next evening, at 6.30 p.m., we called at Newcastle for coal, so, having a few hours there, went ashore to see the city. We returned to the boat about 10.30 p.m., and retired for the night thoroughly tired, and when we awoke next morning at daybreak we were just coming up to the wharf at Sydney. We had now five days left in which to see Sydney, so we visited the Museum, Gardens, Art Gallery, and, on the Sunday afternoon, visited the famous Sydney Zoo—Taronga Park. We also re-visited Narrabeen and secured some more specimens there—one or two not taken on the previous visit there—and were very fortunate in taking a fine aberrant example of the common Brown Butterfly, *Heteronympha merope merope*, Fab.

On Tuesday, 31st October, we left by boat for Melbourne, and had a very interesting voyage across. The Wednesday on board we amused ourselves watching thousands of the Sooty Petrels or Mutton-birds making south to their nesting rookeries at Cape Wollomai, Phillip Island. Next day, at daybreak, we entered Port Phillip Heads, and by 10 a.m. were tied up at Port Melbourne Pier.

The following is a list of the specimens of butterflies secured and noted on the trip, also the life-histories obtained :—

BUTTERFLIES TAKEN AT RICHMOND RIVER, N.S.W.

FAMILY NYMPHALIDAE.

SUB-FAMILY DANAINAE.

Danaida archippus, Fabricius.
Danaida chrysippus petilia, Stoll.
Danaida affinis, Fabricius.
Danaida melissa hamata, Macleay.

SUB-FAMILY SATYRINAE.

Melanitisleda bankia, Fabricius.
Yphthima arctous, Fabricius.
Hypocysta metirius, Butler.
Heteronympha merope merope, Fabricius.

SUB-FAMILY NYMPHALINAE.

Eulepis pyrrhus sempronius, Fabricius.
Phaedyma shepherdi shepherdi, Moore.
Precis villida villida, Fabricius.
Pyrameis cardui kershawi, M'Coy.
Pyrameis itea, Fabricius.
Argynnis hyperbius inconstans, Butler.

SUB-FAMILY ACRAEINAE.

Acraea andromacha, Fabricius.

FAMILY LYCAENIDAE.

SUB-FAMILY LYCAENINAE

Candalides xanthospilos, Hubner.
Candalides absimilis, Felder.
Candalides erinus, Fabricius.
Thysonotis hymetus taygetus, Felder.
Nacaduba lineata lineata, Murray.
Nacaduba felderi, Murray.
Everes argiades, Pallas.
Zizina labradus labradus, Godart.
Neolucia agricola agricola, Westwood.
Theclinesthes scintillata, Lucas.

SUB-FAMILY OGYRINAE.

Ogyris amaryllis amaryllis, Hewitson.

FAMILY PIERIDAE.

Delias argenthona argenthona, Fabricius.
Delias nigrina, Fabricius.
Delias nysa nysa, Fabricius.
Elodina parthia, Hewitson.
Elodina egnatia angulipennis, Lucas.
Anaphaeis java teutonia, Fabricius.
Huphina perimale scyllara, Macleay.
Appias paulina ega, Boisduval.
Catopsilia scylla gorgophone, Boisduval.
Terias libythea zoraide, Felder.
Terias hecabe sulphurata, Butler.

FAMILY PAPILIONIDAE.

Troides priamus richmondius, Gray, Birdwing Butterfly.
Papilio aegeus aegeus, Donovan.
Papilio anactus, Macleay.
Papilio demoleus sthenelus, Macleay.
Papilio sarpedon-choredon, Felder.
Papilio euryplus lycaon, Westwood.
Papilio leosthenes, Doubleday.

FAMILY PAPILIONIDAE—*continued.*

Papilio fuscus capaneus, Westwood.
Papilio macleayanus, Leach.
Eurycus cressida cressida, Fabricius.

FAMILY HESPERIDAE.

SUB-FAMILY TRAPEZITINAE.

Trapezites eliena, Hewitson.
Mesodina halyzia halyzia, Hewitson.
Hesperilla ornata ornata, Leach.
Hesperilla donnysa, Hewitson.
Hesperilla picta, Leach.
Toxidia peroni, Latrielle.
Toxidia leucostigma leucostigma, Meyrick and Lower.

SUB-FAMILY ERYNNINAE.

Padraona lascivia, Rowenstock.
Padraona flavovittata flavovittata, Latrielle.
Padraona sunias, Felder.

SUB-FAMILY ISMENINAE.

Hasora discolor mastusia, Fruhstorfer.
Hasora haslia, Swinhoe.

SUB-FAMILY HESPERINAE.

Netrocoryne repanda, Felder.

A few species were added from Queensland, and are as follows :—

FAMILY NYMPHALIDAE.

SUB-FAMILY DANAINAE.

Euploea corinna corinna, Macleay.

SUB-FAMILY SATYRINAE.

Hypocysta irius, Fabricius.
Tisiphone abeona rawnsleyi, Miskin.

FAMILY LYCAENIDAE.

SUB-FAMILY LYCAENINAE.

Candalides hyacinthina (*eugenia* ?) (nov.)
Theclinesthes miskini, Lucas.

Some stage in the life-history of each of the following species was obtained :—

FAMILY NYMPHALIDAE.

SUB-FAMILY DANAINAE.

Danaida archippus, Fab., eggs and larvae.
Euploed corinna corinna, Macleay, larvae.

SUB-FAMILY NYMPHALINAE.

Phaedyma shepherdi shepherdi, Moore, pupae (from Mr. Robinson).

FAMILY LYCAENIDAE.

SUB-FAMILY LYCAENINAE.

Candalides absimilis, Felder, eggs, larvae, and pupae on five food plants.

Nacaduba felderi, Murray, larvae and pupae.

SUB-FAMILY OGYRINAE.

Ogyris amaryllis amaryllis, Hewitson, larvae and pupae.

Ogyris zozine, Hewitson, larvae and pupae.

FAMILY PIERIDAE.

Delias nigrina, Fabricius, larvae and pupae.

Elodina parthia, Hewitson, larvae.

Elodina egnatia angulipennis, Lucas, larvae.

Anaphaeis java teutonia, Fabricius, larvae and pupae.

Huphina perimale scyllara, Macleay, larvae and pupae.

FAMILY PAPILIONIDAE.

Papilio aegeus aegeus, Donovan, eggs and larvae.

Papilio leosthenes, larvae.

FAMILY HESPERIDAE.

SUB-FAMILY TRAPEZITINAE.

Hesperilla ornata ornata, Leach, pupae.

Hesperilla donnysa, Hewitson, pupae.

SUB-FAMILY HESPERINAE.

Netrocoryna repanda, Felder, larvae and pupae.

SUB-FAMILY ISMENINAE.

Hasora haslia, Swinhoe, larvae and pupae.

We hope this list may help other lepidopterists should they ever contemplate taking a collecting trip to the Richmond River district, and that it will give some idea as to what species of butterflies they may expect to find. It may well be termed "an entomologists' paradise."

EXPLANATION OF PLATE.

Family *Lycænidæ*—Blue Butterflies.

1.—*Ogyris zozine*, Large Mistletoe Blue—(*a*) Male; (*b*) Pupa.

2.—*Ogyris amaryllis*, Satin Blue—(*a*) Male; (*b*) Female; (*c*) Pupa.

3.—*Candalides absimilis*, Pencilled Blue—(*a*) Male; (*b*) Female; (*c*) Pupa.

4.—*Nacaduba felderi*, Little Blue—(*a*) Female; (*b*) Pupa.

Family *Hesperidæ*—Skipper Butterflies.

5.—*Hasora haslia*—(*a*) Male; (*b*) Pupa.

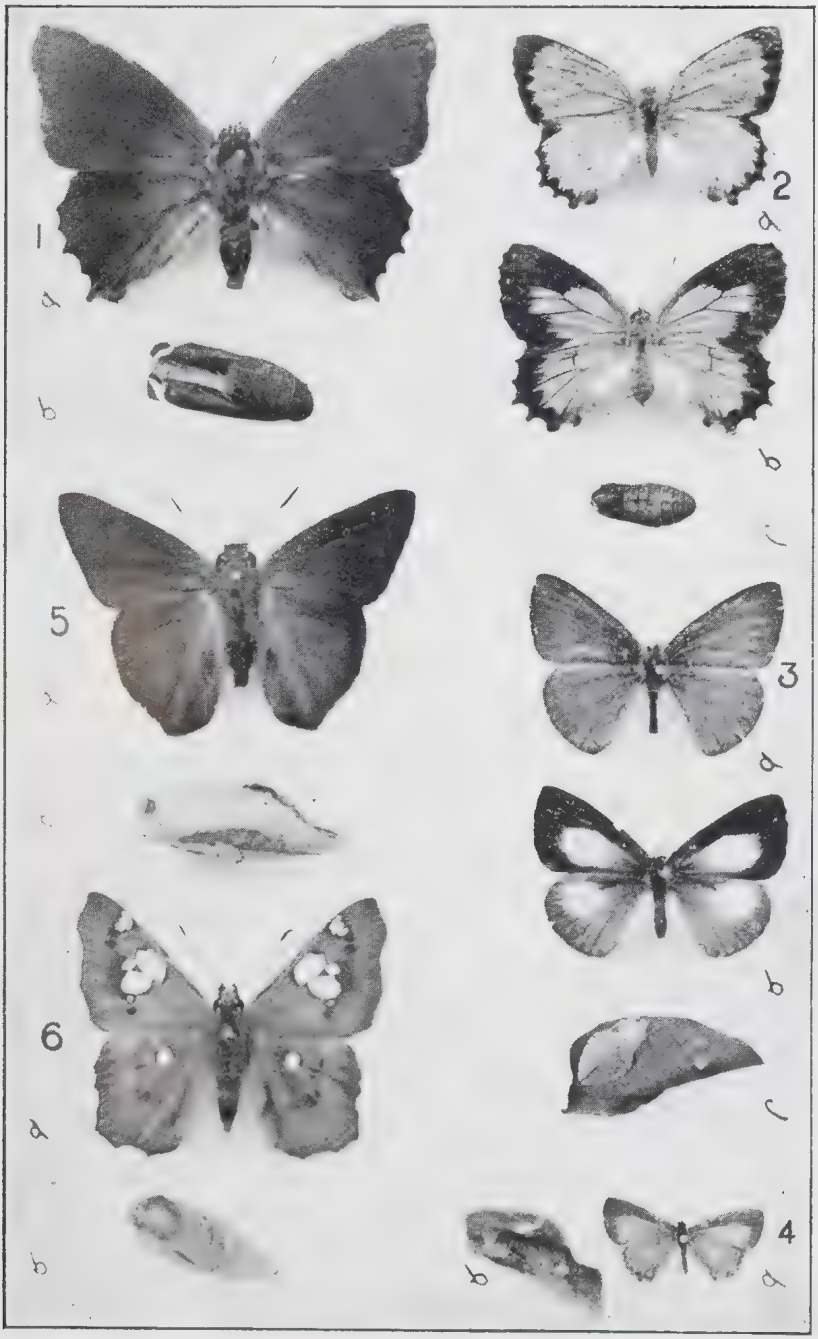
6.—*Netrocoryne repanda*—(*a*) Male; (*b*) Pupa.

CORRECTION.

5.—(*b*) is the pupa of *Netrocoryne repanda*.

6.—(*b*) is the pupa of *Hasora haslia*.

PLATE XVI.



SOME BUTTERFLIES FROM NORTHERN NEW SOUTH WALES AND SOUTHERN QUEENSLAND.

DESCRIPTION OF A NEW VICTORIAN PLANT.

By H. B. WILLIAMSON, F.L.S.

(With Plate.)

(*Read before the Field Naturalists' Club of Victoria, 11th Feb.*, 1924.)

FAMILY EPACRIDACEÆ.

Tribe STYPHELIÆ.

CHORISTEMON, n. gen.

Frutex parvus, floribus 1–3 *sessilibus ramulos terminantibus, bracteis* 2, *sepalis* 5 *margine imbricatis, corolla campanulata lobis vix patentibus æstivatione valvatis intus fere glabris, filamentis planis infra ovarium affixis a tubo omnino separatis æquo æquilongis, antheris paulo exsertis erectis prope basin dorsifixis distincte* 2-*locularibus, disco hypogyno annulari sinuoso, ovario* 5-*loculato, stylo brevi.*

Small shrub with flowers 1–3 sessile, terminating the branchlets. Bracts 2, sepals 5, imbricate. Corolla campanulate, with lobes scarcely spreading, valvate in bud, inside almost glabrous. Filaments flat, inserted below the ovary, quite separated from the tube, and equal to it in length. Anthers slightly exserted, erect, dorsifixed near the base, distinctly 2-celled. Hypogynous disc annular, sinuous. Ovary 5-celled. Style short. Fruit not seen.

CHORISTEMON HUMILIS, n. sp.

Frutex parvus circiter 15-*cm. altus, ramis virgatis glabris, foliis* 5–8 *mm. longis lanceolatis rigidis acutis concavis minute ciliatis infra satis distincte* 3-*costatis, floribus* 1–3 *sessilibus ramulos terminantibus raro solitariis axillaribus, bracteis* 2 *ovatis,* .5 *mm. longis, sepalis* 1.5 *mm. longis imbricatis apice purpureis, tubo corollæ albido* 1.5 *mm. longo lobis tubo æquilongis obtusis intus parce pilosulis, filamentis planis infra ovarium affixis a tubo separatis æquo æquilongis, antheris paulo exsertis erectis prope basin dorsifixis distincte* 2-*locularibus, disco hypogyno annulari sinuoso, ovario* 5-*loculato, stylo brevi.*

Small shrub about 15 cm. high, with virgate, glabrous branches. Leaves 5–8 mm. long, lanceolate, rigid, acute, concave, minutely ciliate, rather distinctly 3 ribbed below. Flowers 1–3, sessile, terminating the branchlets, rarely axillary and solitary. Bracts 2, ovate, .5 mm. long. Sepals 1.5 mm. long, imbricate, purplish towards the summit. Tube of the corolla whitish, 1.5 mm. long, lobes as long as the tube, blunt, inside scantily beset with hairlets. Filaments flat, inserted below the ovary, quite separated from the tube, and equal to it in length. Anthers slightly exserted, erect, distinctly

2-celled, dorsifixed near the base of the anther. By a bend of the filament at the top, which is there beset with a few hairs, the anther projects forward into the throat of the corolla tube. Hypogynous disc annular, sinuous. Ovary 5-celled. Style short.

Brisbane Ranges, about twelve miles south-west of Bacchus Marsh, Victoria; H. B. Williamson, 10th October, 1923.

In placing the new plant in its proper relation to others of the family, the difficulty has been the greater owing to the difference of opinions held by the botanists who have dealt with the group. The division of the family into tribes has been fairly clear and definite. Bentham gives two divisions—*Styphelieæ* and *Epacreæ* -differing in the number of ovules in each cell and in the method of insertion of the style in the ovary. In Engler and Prantl's "Naturaliche Pflanzenfamilien," Drude separates *Prionotes* and *Lebetanthus* as a tribe —*Prionoteæ*—mainly on account of the hypogynous stamens, the principal character on which our new genus is set up. The new plant, however, undoubtedly belongs to the tribe *Styphelieæ*, owing to its single pendulous ovules and the continuity of the style with the ovary. In the subdivision of this tribe a good deal of difference of opinion has been expressed. Bentham, in the "Flora Australiensis," enumerates 15 genera. Mueller united 7 of these under *Styphelia* and two others under *Trochocarpa*, and gave in Frag. Phyt. Aust., vol. vi., elaborate and careful reasons for so doing. Drude, in Engler's work, kept these two last separate, and united 5 only of the 7 under *Styphelia*, keeping *Acrotriche* and *Monotoca* apart. Drude's classification has been followed in Maiden's "Census of New South Wales Plants" (1916), while in the "Census of Victorian Plants" published by the Field Naturalists' Club of Victoria (1923) Bentham's arrangement has been adopted.

A Key to the Genera, compiled from Engler's work, is appended, showing the affinities of the new genus to other genera of the tribe. It will be seen that the subdivision of *Styphelia* does not affect the position of the new plant.

The new plant has a remarkable resemblance outwardly to *Leucopogon virgatus*, R. Br., except in regard to its almost glabrous corolla lobes. This may in part account for its being overlooked for so long. It is known also that the locality, though so near to Melbourne, has not been exhaustively searched by critical observers. It seems certain that Baron von Mueller never botanically explored these ranges. If he had, he could scarcely have omitted to collect and record for the south of Victoria *Olearia iodochroa*, F. v. M. This Daisy Bush, previously recorded for Eastern Victoria, was found by the writer growing abundantly round the spot where the new species was gathered.

KEY TO GENERA.

FAMILY EPACRIDACEÆ.

TRIBE STYPHELIÆ.

A. Corolla tube, 4-lobed, stamens 2 .. OLIGARRHENA
Corolla, tube, 5-lobed, stamens 5 .. .. B.

B. Corolla broadly cylindrical, divided to the middle into 5 lobes, tips infolded in bud .. NEEDHAMIA
Corolla tubular, lobes simply valvate or imbricate .. .. C.

C. Stamens fixed below the ovary, filaments flat, as long as the tube, anthers almost basifixed, distinctly two-celled .. .. .. CHORISTEMON
Stamens fixed on the corolla tube, usually above the middle, filaments terete (ex. some Astroloma), anthers not distinctly two-celled, dorsifixed towards the apex .. D.

D. Drupe with endocarp separable into distinct pyrenes .. .. E.
Drupe with solid bony endocarp and several-celled nucleus .. .. F.

E. Ovary 5-celled, with 5 pyrenes .. PENTACHONDRA
Ovary 10-celled, with 10 pyrenes .. TROCHOCARPA

F. Anthers fixed above the base, deeply divided above into two lobes, corolla cone-shaped at the summit .. .. .. CONOSTEPHIUM
Anthers fixed at the base, movable, mostly undivided .. .. G.

G. Corolla lobes imbricate in bud, tube with reversed hairs inside .. .. BRACHYLOMA
Corolla lobes valvate in bud .. .. H.

H. Anthers connate, surrounding the style .. COLEANTHERA
Anthers not connate into a tube .. .. I.

I. Corolla lobes at the tip bristly-bearded with reversed hairs .. .. .. ACROTRICHE
Corolla lobes glabrous or on the inside towards the throat densely beset with hairs .. J.

J. Ovary 1 or 2-celled, 1-seeded .. .. MONOTOCA
Ovary 5-celled, seldom less by abortion .. K.

K. Anthers exserted .. .. .. L.
Anthers wholly or partially enclosed .. M.

L. Anthers free .. .. STYPHELIA
Anthers connivent or connate, enveloped with the filaments in a dense wool .. .. ASTROLOMA

M. Corolla tube short, with 5 glandular scales inside below the middle .. .. MELICHRUS
Corolla lobes glabrous .. .. .. N.
Corolla lobes bearded inside .. .. LEUCOPOGON

N. Drupe with a several-celled hard nucleus, the mesocarp very pulpy; flowers usually solitary, with imbricate bracts .. .. CYATHODES
Drupe with a several-celled nucleus, the mesocarp moderately pulpy; flowers in spikes or racemes, the bracts and bracteoles distinct .. .. LISSANTHE

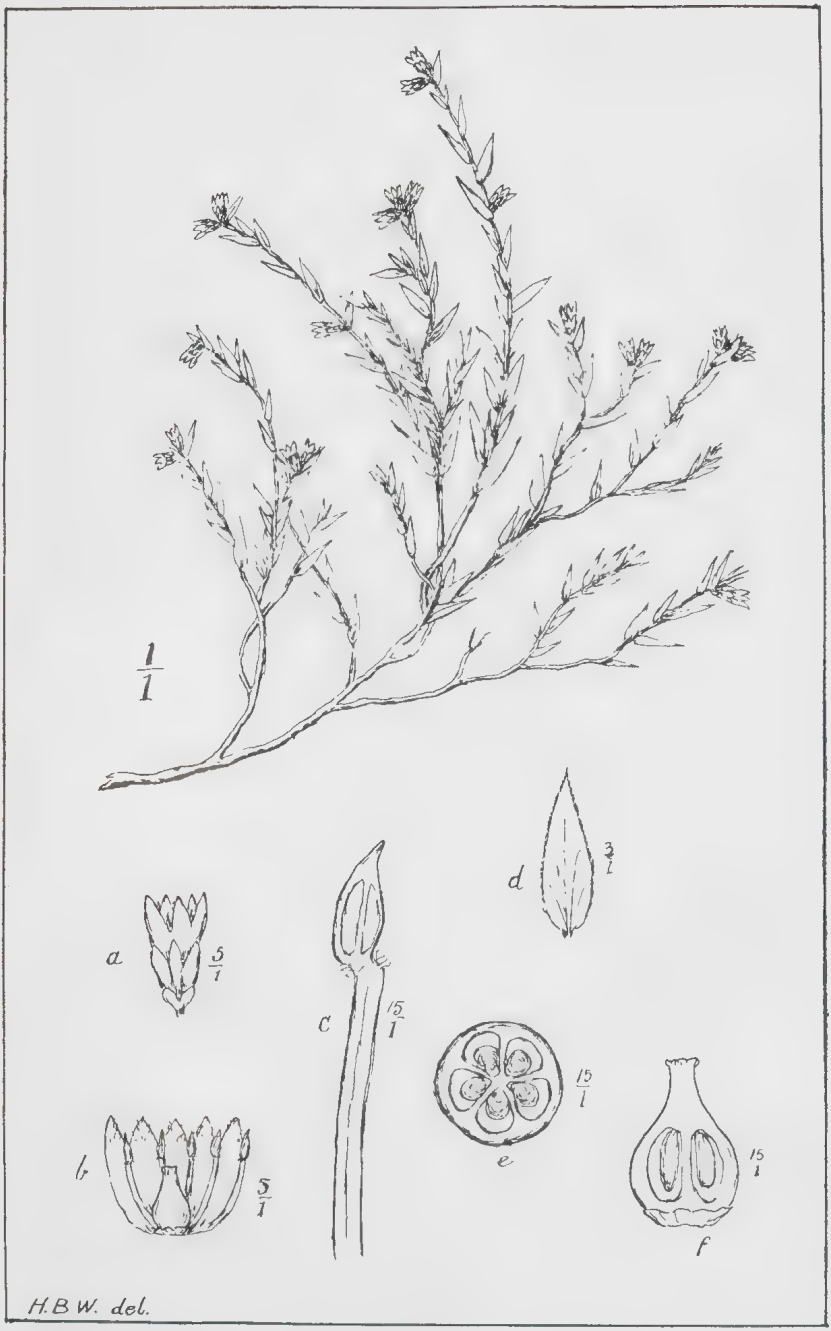
It should be noted that in *Oligarrhena* and *Needhamia* the stamens are inserted on the corolla tube, so that in the method of insertion of the stamens and the attachment of the anther to the filament the new genus stands quite apart from all other plants of the tribe.

EXPLANATION OF PLATE.

a, flower; *b*, flower opened up; *c*, stamen; *d*, leaf; *e*, cross-section of ovary; *f*, longitudinal section of ovary.

MILLIPEDE.—The millipede exhibited at the November meeting was from the Yodda Valley, Papua. These creatures belong to the Order Chilognatha of the Myriapoda. Millipedes have two pairs of legs on each of the body segments, except on the first three. In this they differ from the Chilopoda, or centipedes, as the latter have only a single pair of legs on each segment. Centipedes are predatory, feeding mostly on insects or other small game; the millipedes, on the other hand, mostly feed on vegetable matter that is more or less in a state of decay, although some of the smaller species in Victoria are often very destructive to young plants, especially when the latter are growing on well-manured, loose soils. Most species of millipedes have rounded bodies with numerous feeble legs; some species are also supplied with stink glands as a means of defence. My friend who captured the specimen exhibited to-night informs me that the Papuans are very much afraid of these millipedes, believing that the fluid ejected from the stink glands of these creatures will cause blindness should any of it come into contact with the human eye.—H. W. DAVEY, F.E.S.

PLATE XVII.



CHORISTEMON HUMILIS, Williamson, n. sp.

VOL. XL.—No. 12. APRIL, 1924.

The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria.

Published 10th April, 1924.

Hon. Editor: F. G. A. BARNARD, Esq.

The Author of each article is responsible for the facts and opinions recorded.

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1924.

Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 14th APRIL, 1924.

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBERS—	PROPOSER.	SECONDER.
Miss Dorothy Round, 9 Warburton-road, Camberwell.	Miss R. Chisholm	Mr. C. Daley, B.A.
Miss Sharman, 1 Sir William-street, Kew.	Mrs. M. L. Thompson.	Mr. F. Chapman, A.L.S.
Mr. J. Davidson, 3 Leslie-street, Richmond.	Mr. C. Oke.	Mr. F. G. A. Barnard.

3. Nominations for Membership.

4. General Business.

5. Remarks by Exhibitors relative to their Specimens.

   Ten minutes' adjournment for discussion of Exhibits.

6. Reading of Paper and Discussion thereon.

   The evening will be devoted to Microscopy, see note below.

   The committee will be pleased to receive promises of papers for future meetings.

7. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

   Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and *Naturalist*. Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Club year ends on 30th April next. Any subscriptions overdue should be forwarded to the Hon. Treasurer *at once*.

The Hon. Treasurer requests that members who received tickets for sale for Wild-flower Exhibition will settle for them as early as possible, so that the accounts may be closed.

APRIL MEETING.

It is intended to devote the April meeting (14th) to a display of objects under the microscopes. Members willing to assist will kindly give Mr. J. Searle particulars of what they can do.

SPECIAL NOTICE.—The attention of members is directed to item 8 of business paper. Notices of exhibits should, if possible, be type-written.

The Victorian Naturalist.

Vol. XL.—No. 12. APRIL 10, 1924. No. 484.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 10th March, 1924.

The president, Mr. C. Daley, B.A., F.L.S., occupied the chair, and about sixty members and visitors were present.

REPORTS.

A report of the excursion to Lilydale on Saturday, 1st March, was given by the leader, Mr. F. Chapman, A.L.S., who said that quite a large party assembled for the purpose of visiting the Cave Hill limestone quarry. This is a favourite hunting-ground for geologists, but unfortunately the material is very hard, and requires considerable labour and skill to secure presentable specimens; however, a number of interesting species were collected, and a profitable afternoon spent.

ELECTION OF MEMBERS.

On a ballot being taken, Mrs. Hannah Hassfield, 12 Jackson-street, St. Kilda; Mr. Leonard Allen, The Ridgeway, Ivanhoe; and Mr. Ernest G. Woods, 8 Morang-road, Hawthorn, were duly elected as ordinary members, and Mr. E. Paul, 12 Virginia-street, Geelong, as a country member of the Club.

GENERAL BUSINESS.

The chairman referred to the approaching departure of Mr. A. E. Keep, on a visit to England, and wished him *bon voyage* on behalf of the Club. He said that Mr. Keep would be given a letter of introduction to the Selborne Society of London. Mr. Keep, in replying, said that he trusted to have a pleasant time in England, and hoped that on his return he would be able to interest the members in his travels.

The chairman also said that, owing to her change of residence from Melbourne to Sydney, the Club would shortly lose Mrs. Shiels as a member. He trusted she would find the outings of the local naturalists' society of equal interest to those of the Melbourne society.

PAPER READ.

By Mr. Chas. Oke, entitled "Notes from Natya."

The author said that the paper was based principally on the Club excursion to that district, which is situated on the Murray, near Swan Hill, in September, 1922. He gave brief descriptions of various objects met with, principally entomological, of which he exhibited a fine series in illustration of his remarks.

Messrs. H. B. Williamson, F.L.S., F. E. Wilson, and others

joined in a short discussion which followed the reading of the paper.

EXHIBITS.

By Mr. A. G. Brown, LL.B.—Bud and flowers of the Western Australian Gum, *Eucalyptus cornuta*, Lab.

By Mrs. E. Coleman.—Flowers of the orchids *Prasophyllum despectens*, Hk. f., and *Chiloglottis reflexa* (*diphylla*), from Healesville (9th March, 1924); *Prasophyllum Archeri*, Hook f., from Blackburn (10th March, 1924).

By Mr. F. Chapman.—Silurian fossils collected during excursion to Cave Hill, Lilydale — viz., *Clathrodictyon*, sp., a stromatoporoid usually forming bun-shaped masses in Palæozoic coral reefs, and showing a laminar and pillared structure. In this genus the pillars are discontinuous with those of the succeeding layers; *Coelocaulus apicalis*, Chapm., a Murchisonia-like snail with a slit-band and hollow columella (hence the generic term); also a giant slug, from Balwyn—the introduced Black Slug, *Arion ater*. This specimen measures five inches in length, and may be regarded as a gerontic or senile example. The skin in this species is reddish or greyish-black, and wrinkled, and the shell (concealed) composed of loosely-aggregated calcareous particles. Feeds irrespectively on cabbages, fruit, common earthworms, or its own kind. The specimen exhibited was found amongst the tomatoes.

By Mr. J. A. Kershaw.—Egg of Carpet Shark, *Cephaloscyllium laticeps*, Dumerill, from Tasmania.

By Mr. V. Miller.—Volcanic matter from Tower Hill, Koroit.

By Mr. C. Oke.—Insects from Natya, in illustration of paper.

By Mr. E. E. Pescott, F.L.S.—Specimens of Privet and Carraway, from Mildura, and English Soy, from Macedon, each infested with Dodder, *Cuscuta europæa*, from Mildura; flowering specimens of Darling Lily, *Crinum flaccidum*, Hook, from Mildura.

By Mr. F. Pitcher.—Flowers and fruiting stems of Erect Clematis, *C. glycinoides*, grown at South Yarra.

By Mr. W. H. A. Roger.—"Ribbon stones" found at Anthony's Lagoon, Northern Territory; also a similar stone, cut and polished, mounted as a brooch.

By Mr. J. Searle.—Sagitta, or "Arrow Worms," known to local fishermen as "Needles"; Apendicula, larvæ of Sea-squirt; Pelagic mollusca (Pterapoda).

By Mr. L. Thorn.—Moonlight-blue Butterfly, *Miletus delicia, delos*, with eggs, larva, and pupa.

By Mr. H. B. Williamson, F.L.S.—Dried specimens of *Tribulus terrestris*, Lin., "Caltrop"; *Solanum escuriale*, Lindl., collected at Koonoomoo, near Cobram, by Miss Parsons, February, 1924; *Centaurea nigra*, L. (introduced), collected on Woods' Point road by Rev. A. C. F. Gates, M.A.; *Eragrostis diandra*, Close-

headed Love-grass, *Sporobolus virginicus* (L.), Kunth., var. *pallida*, Pale Rat-tail Grass, *Lipocarpha microcephala* (R. Br.), Kunth., Button Rush, *Fimbristylis æstivalis*, Vahl., Summer Fringe-rush, *F. squarrosa*, Vahl., Veiled Fringe-weed, and *Cyperus difformis*, L., Variable Leaf-rush, all collected at Mildura by Messrs. E. E. Pescott and C. French, jun.

After the usual conversazione the meeting terminated.

EXCURSION TO LILYDALE.

The objective of this excursion on Saturday, 1st March, was the Cave Hill limestone quarry. This was last visited by the Club about four years ago. On the present occasion we happened to experience a rather warm day, which was, later in the afternoon, tempered by a gentle breeze. The party, which numbered twenty-six, explored, with the greatest interest, the utmost recesses of this wonderful exposure of fossiliferous limestone. At the entrance to the quarry, looking down into the great excavation, the leader pointed out some of the features of the limestone—its coral reef nature, the highly tilted beds, and the eroded surface after uplift. Looking across the quarry there was seen, on the opposite side, a wide U-shaped mass of decomposed basalt, which represented the sectional view of a lava stream that had flowed down an old creek-bed, traversing the limestone area in pre-Miocene times of more than three million years ago—an episode of yesterday compared with the coral reef formation of the main part of the quarry. These facts at once deprive Tutenkhamen of the slightest claim to antiquity. Later on we found some fallen blocks of the decomposed basalt, which showed, towards the centre of the bomb-like masses, a nucleus of dense, crystalline rock. The members then descended to the middle quarry and collected from the heaps of limestone, which, however, yielded only the Honeycomb Coral, *Favosites*. The floor of the quarry can now, apparently only be reached by the truck line, and, although the descent was difficult and anything but a demonstration in eurythmics, the effort was worth while, for some beautifully-weathered surfaces of the old Silurian limestone were discovered. These revealed, as in a picture, the perfect structures of corals, hydrozoa, and calcareous plants, once imbued with life in the Lilydale sea-bed. Some of the grey, friable limestone was secured for breaking down, in hope of finding further specimens of Ostracoda, such as were described in 1903 in the *Proc. Roy. Soc. Vict.* Amongst the fossils found were: —Corals. —*Favosites grandipora*, *Cyathophyllum* sp., *Cœnites* sp. Hydrozoa. *Clathrodictyum* sp., and other forms of stromatoporoids, including examples showing *Caunopora* tubes. Gasteropoda. —*Euomphalus northi*, *Cœlocaulus apicalis*.—F. Chapman.

NOTES ON THE ORCHIDS OF VICTORIA.

No. II.

By EDWARD E. PESCOTT, F.L.S.

(*Read before the Field Naturalists' Club of Victoria, 14th Jan.*, 1924.)

My last "Notes" were published in the *Victorian Naturalist* for January, 1921 (vol. xxxvii., p. 109). These included lists and brief descriptions of thirty-three new species, several new to science, which had been recorded by various collectors since the publication of the first list of the Plant Names Committee in July, 1911.

Since 1921 several new species and varieties have been collected, and several changes have been made in nomenclature. Some of these are new species.

LITERATURE.—No new Victorian literature has been published, but in Part I. of J. M. Black's "Flora of South Australia" Dr. R. S. Rogers, M.A., has written the section on "Orchids"; and as many of our orchids occur also in South Australia, this volume is especially valuable to Victorians. The descriptions are very full, meanings of the names of genera and species are given, and the pages are well illustrated.

CHANGES OF NOMENCLATURE.—It is inevitable that, as botanical research continues, changes of names should follow, for the law of priority of naming demands that the first name given to a particular species shall be its recognized name. Under this law the following changes have been made:—

The genus Drakæa becomes Spiculæa. Thus, our Victorian species are *Spiculæa irritabilis* and *S. Huntiana*.

Pterostylis præcox, Lindl., becomes *P. alata*, Reich.

Chiloglottis diphylla, R. Br., becomes *C. reflexa*, Cheel. It is worth noting that this orchid, which for many years was only collected in autumn, has been found in a few cold localities in spring.

The above changes are recorded in the recently-issued "Census of the Plants of Victoria."

In a paper recently published in Fedde's "Repertorium Specierum Novarum Regni Vegetabilis," published in March, 1923, R. Schlechter gives a revision of the genus Corybas, Salisbury, equal to Corysanthes, R. Br. If this revision holds, Corybas being the prior name, that must stand as the genus name for all of our Corysanthes. The following will be the changes:—

Corysanthes bicalcarata, R. Br., becomes *Corybas aconitiflorus*, Salis.

C. fimbriata, R. Br., becomes *C. fimbriatus*, Rchb.
C. pruinosa, R. Cunn., becomes *C. pruinosus*, Rchb.
C. unguiculata, R. Cunn., becomes *C. unguiculatus*, Rchb.

The genus Corysanthes (Corybas) extends from the Himalayas and Borneo through the intervening islands to Papua, Australia, Samoa, Tahiti, New Hebrides, New Caledonia, New Zealand, and Tasmania.

It was decided that no varieties of species should be included in the "Census of the Plants of Victoria": thus, *Prasophyllum album*, Rogers, has been omitted from the list, as Dr. Rogers has reduced it to a variety of *P. odoratum*, Rogers.

NEW RECORDS.—The following orchids have been recorded as "new" for Victoria, having previously been known in other States:—

Calochilus cupreus, Rogers, collected in the Grampians by J. W. Audas, F.L.S.

Thelymitra megalyptra, Fitz., collected in the Grampians by J. W. Audas, F.L.S.

Microtis parviflora, R. Br., collected in various parts of the State by several collectors.

Corysanthes (*Corybas*) *bicalcarata*, R. Br., collected at Healesville by Mrs. E. Coleman. It is readily recognized by the two white spurs.

Caladenia iridescens, Rogers, first collected by the writer in the Grampians; subsequently found in the south as well. Its bronzy, metallic appearance is remarkable.

Caladenia pumila, Rogers. This is a dwarf, hairy species, of low growth, with an unusually large flower for its size, being very open and white, with wide florets. It was sent to the writer from Bannockburn.

Caladenia reticulata, Fitz., is found in several localities in the south and east. The purple veining on the labellum, which is serrated on the edge, is very distinct. It belongs to the *C. Patersoni* group.

Pterostylis cycnocephala, Fitz., is an old species which has been confused with *P. mutica*, R. Br. The latter is much more dwarf than the former. It has the labellum appendage pointing backwards, while in the former, which is a stout species, the appendage is pointing forwards.

SPECIES NEW TO SCIENCE.—Five species new to science have been found in Victoria, as well as several varieties.

Prasophyllum Brainei, Rogers, was collected at Ringwood by Mr. C. French, jun., and the writer. It is of medium growth, green in colour, and distinctly fragrant. It is named after Arthur B. Braine, an orchid collector.

Dr. R. S. Rogers, M.A., read a paper before the Royal Society of South Australia on 11th October last on new Australian records. He has courteously supplied the following details of four new Victorian species:—

Prasophyllum Colemanæ, Rogers.

This handsome species reaches a height of nearly 18 inches. The flowers are conspicuous, with rather large flat lilac labellum and blunt lilac petals. The paired sepals do not cohere, and are widely separated. The membranous portion of the labellum is very voluminous, and there is very little flexion in that segment.

It is named after Mrs. Edith Coleman, its discoverer, and was collected by her at Bayswater. It is a late bloomer.

Prasophyllum Tadgellianum, Rogers.

This is an alpine species, published as a variety of *P. Frenchii* by Rogers in Trans. Roy. Soc. S.A., 1922, but now raised by him to specific rank. The flowers are mainly red-streaked, sometimes green or maroon-coloured. The labellum is unusually wide and semicircularly recurved. It has sometimes conspicuous chocolate markings upon it. Its lateral sepals, unlike those of *P. Frenchii*, are connate.

It was first reported by Mr. A. J. Tadgell (in whose honour it is named) in December, 1914, from the Victorian Alps, and subsequently by Dr. Green from Mount Kosciusko (7,300 feet), in December, 1921. It has not been found lower than 5750 feet.

Microtis oblonga, Rogers.

This species is by no means uncommon, and is known to occur in South Australia as well as in Victoria. In the latter State it has been received from the following localities:—Cravensville, Braine; Ringwood, Braine; Healesville, Mrs. Coleman; Ferntree Gully, Pescott; Grampians, C. W. D'Alton. Its name has reference to its oblong labellum, and it occupies a place midway between *M. porrifolia* and *M. parviflora*. It is often tall, very slender, with an attenuated inflorescence, the flowers of which are quite small. The labellum is long, and, unlike that of *M. parviflora*, has a marked callosity at the tip in addition to the two basal ones; the tip is never deeply emarginate as in *M. porrifolia*. The ovary is long and slender, and quite unlike that of the latter species.

The plant is quite distinctive and easily recognized. It will probably be reported from many new stations.

Pterostylis decurva, Rogers, approaches closely to *P. obtusa*, but blooms in the same locality as the latter in November instead of April. The apex of the galea is prolonged into a very long depressed or decurved point, from which feature the name is derived. It was first reported from Lower Ferntree

Gully, Pescott: Ringwood and Belgrave, Pescott and A. N. Burns.

NEW VARIETIES.—Two new varieties have been named by Dr. Rogers, both having been collected at Alberton by Mr. A. J. Tadgell.

Prasophyllum australe, R. Br., var. *viscidum*, Rogers.—It is a slender plant, with small dark red or prune-coloured flowers, with dark blotches, and being very viscid.

Caladenia carnea, R. Br., var. *aurantiaca*, Rogers, is a slender variety, the white perianth segments being striped with green on the outside. The labellum is pure white, with the exception of the tip, which, with the calli, are deep orange in colour. The calli are in two rows.

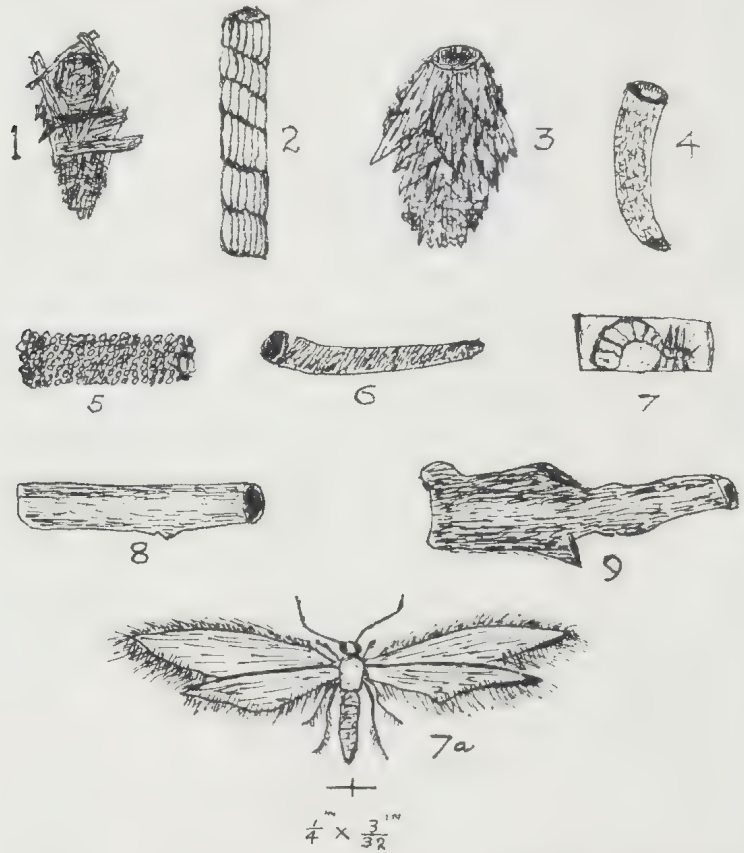
COLOUR.—Reference may be made to our last notes, wherein it was stated that "it is the structural form, and not the colour, of the flower, that determines the species." This year several almost pure white flowers of *Thelymitra epipactoides*, F. v. M., were collected in the Queenscliff district.

AQUATIC HOUSE-BUILDERS.

THERE is a small but interesting group of insects inhabiting our ponds and streams, the adult members of which are seldom seen among collections of insects; and the young entomologist who will take up the study of these is sure of a greater reward in the way of new species than he who spends his time on the better-known orders, such as Lepidoptera or Coleoptera. The insects alluded to are the Caddis-flies. At one time they were thought to be a family of the Lepidoptera, on account of their wings being covered with hairs; other entomologists thought they should be placed in an order by themselves, which they called Trichoptera, or hairy-winged. At present they are included in the Neuroptera as a special family called Phryganidæ. Caddis-flies are dull-coloured, sluggish insects, resting or hiding among the foliage surrounding the pools or streams by day and taking flight as the evening merges into twilight and darkness. Their eggs, when laid, are covered with a glutinous substance which swells out on coming in contact with water, in a similar way to those of the gnats, forming, in some species, strings of eggs; in other species they have a flattened, disc-shaped appearance; but in every case the young larvæ, as soon as hatched, begin to make protecting cases for themselves. These cases are very varied in shape and mode of construction.

'Some are an untidy collection of rubbish loosely fastened together (fig. 3); in others the material is arranged neatly in symmetrical tubes (figs. 1 and 2). Some compose their cases of

grains of sand (fig. 5), others of shells of planorbis and other snails. A small species I took in numbers on the Baw Baw plateau composed their horn-shaped cases of shining fragments of mica (fig. 4), and looked like living, iridescent gems as they moved along the bed of the small streamlet. A very similar caddis-worm with a case of the same shape, but composed of some dark substance, is common in the lake of the Botanical Gardens (fig. 6). Sometimes the caddis-worm will take



possession of a hollow stem of straw or reed (fig. 8) instead of building a case for itself, and you find them even in pieces of decayed wood (fig. 9). So bulky, indeed, are some of these cases that sometimes one wonders how the worm manages to drag them along as they creep over the bottom of a pool or climb among the weeds: but when one remembers that the submerged cases lose weight equal to their bulk of water, a

weight that could not be moved on land is easily carried about in the water. In moving about, the head and thoracic segment bearing the legs alone are protruded from the case, and they sometimes swim through the water by rapidly vibrating this portion of their bodies. These segments have a chitinous covering and are blotched or mottled with a dark pigment; the rest of the worm, which is protected by the case, is lighter in colour, and is a tempting, succulent morsel for fish and aquatic carnivora. Just behind the mandibles with which the mouth is provided is the spinnerette, connected with a gland from which is secreted the fluid that makes the silken web used in lining the cases and binding their material together. A pair of legs is attached to each of the three thoracic segments. The first abdominal segment has two lateral processes and a dorsal tubercle; this latter can be protruded and retracted at will, and these three processes, together with the two strong hooks at the anal end of the larva, serve to hold the case securely. The remaining abdominal segments have branchial processes, varying in shape and number in different species, which enable the larva to keep its blood supplied with oxygen. An undulatory motion of the abdomen causes a stream of water to flow through the tube, bringing oxygen to these filaments. When preparing to pupate the larva spins a silken network over the openings at each end of the case, which protects it from the attack of foes, while at the same time allowing the water free access so that the breathing process may not be interfered with. The larva then casts its skin and becomes a pupa possessed of large, sickle-shaped mandibles—not for devouring food, for the insect does not eat at this stage of its life-history, but for breaking away the silken partition closing the tube, so that when its metamorphosis is complete the imago may have free access to the aerial world. Having freed itself from its case, the pupa, braving the dangers besetting it on all sides from aquatic carnivora, climbs out of the water and rests on some stone or water plant until its skin dries and splits, allowing the perfect insect to emerge, and, after drying its hairy wings, devote the rest of its short life to mating and depositing its eggs.

All caddis larvæ do not construct cases; there is at least one species found among willow roots and other vegetation, carnivorous in its habits, that simply spins a loose web, like a spider, and lies in wait for some unwary insect to blunder into its snare, when its strong mandibles soon complete the tragedy. Chironomus larvæ seem to be its favourite diet.

The smallest species of caddis larva I am acquainted with is frequently taken among spirogyra, &c. It makes a flat case of silk, about three-sixteenths of an inch in length, through

the transparent walls of which the larva may be seen (fig. 7). The head and throat are remarkably thin and the legs very slender, but the abdominal segments gradually increase in size towards the anal end, and are curved, giving the larva a hunched and crowded appearance when at rest in its case. When about to pupate it fastens its case by the four corners to the vegetation, or on the sides of the aquarium. The imago (fig. 7*a*) is so remarkably like a plumed winged moth that it might easily be mistaken for a specimen of micro-lepidoptera. Its wings, when expanded, measure a quarter of an inch from tip to tip, and are deeply fringed, while the body is less than one-eighth of an inch in length.—J. Searle.

Early Orchids.—Owing, no doubt, to the unusual rainfall during January, several orchids have appeared earlier than recorded in my notes for the last four years. On 21st February blooms of the Blunt-tongue Orchid, *Pterostylis obtusa*, were found at Ferntree Gully three weeks earlier than previously recorded; while the Autumn Bird-orchid, *Chiloglottis diphylla*, was found in flower at Healesville on 20th February, two months in advance of my earliest record. The conditions appear to be especially favourable to this orchid, for yesterday I found dozens of blooms where ordinarily I would have found only one or two on the corresponding date.—E. Coleman, Blackburn, 10th March, 1924.

Prasophyllum Tadgellianum, Rogers.—This orchid, first found by Mr. A. J. Tadgell, in 1914, on Mount Bogong, North-Eastern Victoria, was recorded by Dr. R. S. Rogers, of Adelaide, as a variety of *P. Frenchii*, and so described in the *Trans. Royal Society of South Australia*, vol. xlvi. (1922); but from the consideration of further material he has decided to raise it to specific rank under the name of *Prasophyllum Tadgellianum* (*Trans. Roy. Soc. S. Aust.*, vol. xlvii., 1923). This orchid, which is illustrated on plate xviii. (enlarged to twice its natural size), is stouter than *P. Frenchii*, has a very wide labellum, which is not laterally contracted as in that species, while the lateral sepals are consistently connate. The flowers are pale greenish-yellow, or yellow with chocolate markings down the middle of the perianth segments, also down the middle and on the sides of the labellum, the chocolate markings giving the flowers a very distinctive appearance. The callous part of the labellum is much wider than the membraneous portion. It is found only in alpine situations, and is recorded from Mounts Bogong and Hotham (Victoria) and Kosciusko (New South Wales). It flowers in January and February. It will be known as the "Bogong Leek-Orchid." The illustration is from a photograph by Mr. T. Green.

PLATE XVIII.

PRASOPHYLLUM TADGELLIANUM, Rogers, ×2.

Photo. T. GREEN.

CENSUS OF VICTORIAN PLANTS.

Supplement No. 2.

The following additions and alterations have been made to the "Census of Victorian Plants" by the Plant Names Committee of the Field Naturalists' Club of Victoria :—

Additions.

Page 10.—Poa Labillardieri, Steud. ..	.. Blue Tussock-grass	..	S.W., E.
,, 18.—*Prasophyllum album, Rogers	.. White Leek-Orchid		S.
.. 18.—* ,, Tadgellianum, Rogers	Bogong Leek-Orchid		N.E. (Mt. Bogong, A. J. Tadgell)
,, 26.—*Kochia excavata, J. M. Black	.. Bottle Blue-bush	..	N.W.
,, 29.—Ranunculus Muelleri, Benth.	.. Felted Buttercup	..	N.E. (Mt. Bogong, A. J. Tadgell)
,, 35.—Pultenæa acerosa, R. Br. ..	.. Bristly Bush-Pea	..	S.W. (Grampians, J. W. Audas and C. D'Alton).
,, 52.—After Cyathodes add—			
*Choristemon humilis, H. B. Williamson ..	.. Anakie Heath	..	S. (Brisbane Range, H. B. Williamson)

* New to science.

New Localities.

Page 2.—Notholæna distans, R. Br.	.. Bristly Cloak-fern	..	S. (Dandenong R'ges, F. G. A. Barnard, 1903; Keilor, A. J. Tadgell, 1923)
.. 7.—Panicum prolutum, F. v. M.	.. Pallid Panic-grass	..	S. (Lara, Rev. A. C. F. Gates, M.A.)
.. 8.—Amphipogon strictus, R. Br.	.. Grey-beard Grass	..	E. (Sale, H. B. Williamson, F.L.S.)
.. 10.—Diplachne loliiformis, F. v. M.	.. Rye Beetle-grass	..	S. (Lara, Rev. A. C. F. Gates, M.A.)
.. 12.—Cladium articulatum, R. Br.	.. Jointed Twig-rush	..	E. (Sale, H. B. Williamson, F.L.S.)
.. 35.—Pultenæa laxiflora, Benth. ..	.. Loose-flower Bush-Pea		S. (Brisbane Range, C. S. Sutton, M.B.)
.. 56.—Eritrichium australasicum, D. C.	.. Hairy Forget-me-not		E. (Newry, Miss N. Curtis)
.. 58.—Anthocercis Eadesii, F. v. M.	.. Large-leaf Ray-flower		N.W. Mt Arapiles, C. D'Alton)
.. 61.—Isotoma axillaris, Lindl. .	.. Rock Isotome	..	E. (Newry, Miss N. Curtis; Nowa Nowa, F. G. A. Barnard)
.. 63.—Olearia iodochroa, F. v. M.	.. Violet Daisy-bush	..	S. (Brisbane Range, Rev. A. C. F. Gates)
.. 67.—Rutidosis leptorrhynchoides, F. v. M.	Button Wrinklewort		E. (Newry, Miss N. Curtis)

Corrections.

Page 30.—For "Casytha" read "Cassytha."
,, 55.—For "Typlophora" read "Tylophora."
,, 83.—For "Violet Periwinkle" read "Common Violet."

Note.—Supplement No. 1 in *Victorian Naturalist*, December, 1923 (vol. xl., p. 147).

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(*d*) Now deceased.

THE

VICTORIAN NATURALIST

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OF THE

Field Naturalists' Club of Victoria

VOL. XLI

MAY, 1924, TO APRIL, 1925

Hon. Editor: MR. F. G. A. BARNARD

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ERRATA:

Page 6—Errata in *Naturalist*, April, 1924.

Page 24—Errata in *Naturalist*, May, 1925, page 2.

Page 96—Errata in Bogong Plants, pages 53-74.

Page 99 Erration in August *Naturalist*, page 90.

Page 147, line 21—For "Guaphalium" read "Gnaphalium."

Page 163, line 20 For "Silcified Lignita" read "Silicified Lignite."

Page 204, line 11—For "*Senecio odoratus*" read "*Veronica notabilis*."

Page 204, line 15—For "Orchid" read "Orchard."

Page 209, line 12 from bottom — For "luxurious" read "luxuriant."

Page 232—Errata in Noojee Plants, pages 170-183.

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1924.

Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 12th MAY, 1924.

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBER—	PROPOSER.	SECONDER.
Miss MacGeachy, "Deepdene," Burke-road, Balwyn.	Mr. A. F. Fullard.	Mr. C. Oke.

3. Nominations for Membership.

4. General Business.

   1. Election of Two Auditors.
   2. Nominations of Office-bearers for 1924-5.

5. Remarks by Exhibitors relative to their Specimens.

   Ten minutes' adjournment for discussion of Exhibits.

6. Reading of Paper and Discussion thereon.

   1. By Mr. J. C. Goudie—"The Coleoptera of North-Western Victoria" Part XI.
   2. By Mr. P. F. Morris—"Description of a new Victorian Brachycome."
   3. By Mr. L. Thorn—"Notes on Victorian Lycaenid Butterflies."

   The committee will be pleased to receive promises of papers for future meetings.

7. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

   Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and *Naturalist*. Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Club year ended on 30th April last. Any subscriptions overdue should be forwarded to the Hon. Treasurer *at once*.

Subscriptions for the year 1924-5 became due on 1st May, and must be paid on or before 16th June to entitle voting at the annual meeting on that date.

SPECIAL NOTICE.—The attention of members is directed to item 8 of business paper. Notices of exhibits should, if possible, be type-written.

The Victorian Naturalist.

Vol. XLI.—No. 1. MAY 8, 1924. No. 485.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday, 14th April, 1924.

The president, Mr. C. Daley, B.A., F.L.S., occupied the chair, and about fifty members and visitors were present.

REPORTS.

A report of the excursion to Sherbrooke, on Saturday, 15th March, was given by the leader, Mr. F. Pitcher, who reported a good attendance of members. The object of the excursion was ferns, and of these twenty-six species were noted during the day. Some gullies, not often visited, around the head waters of the Monbulk Creek, proving a delighful area for investigation.

On the motion of Messrs. F. Pitcher and C. Daley, it was decided that a letter of thanks be sent to Miss Billing, of Sherbrooke, for her hospitality to the members of the excursion party.

A report of the excursion to the Botanical Gardens on Saturday, 29th March, was given by the leader, Mr. P. R. H. St. John, who said that, notwithstanding a showery afternoon, there was a good attendance of members who enjoyed the outing. The conservatory, propagating sheds, &c., were visited, and many interesting novelties brought under the notice of the visitors.

A report of the excursion to Bayswater on Saturday, 5th April, was given by the leader, Mr. C. Oke, who said the excursion had been well attended, and as the day was all that could be wished it had been much enjoyed. Insects were the objects of search, but, excepting ants, were not numerous. Numbers of the crater-like openings to the nests of the Brown Ant, *Aphanogaster longiceps*, were observed, and their mode of construction investigated. A specimen of the Black-mottled Lacewing, *Porismus strigatus*, Bohem, proved a great attraction to several of the excursionists who were unacquainted with it.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Dorothy Round, 9 Warburton-road, Camberwell; Miss Sharman, 1 Sir William-street, Kew; and Mr. J. Davidson, 3 Leslie-street, Richmond, were duly elected members of the Club.

GENERAL BUSINESS.

The president, on behalf of the Club, offered congratulations

to several members who had secured University honours at the recent examinations—viz., Miss R. Chisholm as B.A.; Mr. P. C. Morrison as B.Sc.; and Mr. C. D. Gillies, M.Sc., as B.S., also to the daughter of a member, Miss D. Coleman, who is an enthusiastic worker at the wild-flower exhibitions, as B.A.

Mr. E. E. Pescott, F.L.S., referred to the recent retirement from the Education Department of the Club's president, Mr. C. Daley, B.A., F.L.S., and wished him many years of life to enjoy his well-earned rest. He was supported in his remarks by Messrs. Barnard, Williamson, and Hardy.

Mr. Daley briefly responded.

Mr. W. J. Stephen called attention to the proposal to form golf links in Riversdale Park, and urged that the Club take steps to prevent the removal of trees from the eastern portion of the park, which was a beautifully wooded area, such areas adjacent to Melbourne being now very scarce. He moved that a letter be written to the Tramway Board to that effect. This was seconded by Mr. E. E. Pescott, and carried unanimously.

Some discussion took place regarding the proposed American Museum expedition to Australia for collecting ethnological specimens, and on the motion of Messrs. Pescott and Barnard it was decided to communicate with the Minister of Customs, and urge that the collection be made only under stringent conditions, and that the export of any specimens be prohibited.

NOTES ON EXHIBITS.

Mr. F. Pitcher drew attention to his exhibit of ferns from the Strathbogie Ranges, and remarked on the interesting nature of the vegetation of the district.

Mr. L. Thorn drew attention to his exhibit of the various stages in the life history of one of the lycæmid butterflies.

Mr. E. E. Pescott drew attention to a series of hand-coloured photographs of Australian birds and flowers exhibited by Mrs. E. Coleman, the work of Miss Llewellyn, of Ballarat.

MICROSCOPICAL DISPLAY.

In place of the reading of papers, the evening was devoted to a display of microscopic objects by members, about twenty microscopes being in use.

The following are some of the principal objects shown :—

By Mr. F. Chapman, A.L.S.—Section of Devonian Chert, from Rhymil, Aberdeenshire, Scotland, containing the oldest known structure in any fossil plant, *Rhznia gwynne-Vaughani;* type slides of interesting and rare foranimifera, from Nare's Harbour, Admiralty Island, Cocos-Keeling Island, Great Barrier Island, New Zealand, Coldaren, Farol Channel.

By Mr. V. Gray.—Rotifer colony, *Lacinularia natans.*

By Miss O. Hardy.—Entomological slides, including stomata of larva of Gum Emperor Moth, showing valve-like structure; pollen basket of bee, &c.

By Mr. A. D. Hardy.—Botanical sections, including sections of wood of Blue Gum, *Eucalyptus globulus*, and Murray Pine, *Callitris verrucosa*; pollen grain of various trees, &c., showing different forms.

By Mr. C. Lambert.—Botanical sections.

By Mr. C. Oke.—Proventriculus of Apple-borer Beetle, *Leptops hopei.*

By Mr. J. Searle.—*Tubercle bacilli*; Larva of Small Caddis-fly; Simulinum larva (larva of a small black fly very troublesome to cattle).

By Mr. A. L. Scott.—Sections of basalt under ordinary and polarised light.

By Mr. J. Shephard.—Larval Branchipods, Branchipus (adult), Eulimnidia (adult), Lepidurus (adult).

By Mr. J. Strickland.—Anthrax bacillus.

By Mr. J. Wilcox.—Rotifer, *Melicerta ringens.*

EXHIBIT.

By Mr. F. Pitcher.—Austral Filmy Fern, *Hymenophyllum australe*, collected on Sherbrooke excursion, 14th March, 1924; stem of Common Bracken Fern, 7 feet 3 inches long, from Lima East, Strathbogie Ranges; also dried specimen of Sickle Fern, *Pellæa falcata*, Blanket Fern, *Pleurosorus* (*Grammitis*) *rutæfolius*, and Rock Fern, *Cheilanthes tenuifolia*, fronds over eighteen inches long; juvenile and adult foliage of Blue Gum, *Eucalyptus globulus* (adult leaves over twenty inches long), from Sugarloaf Creek, Strathbogie.

After the usual conversazione the meeting terminated.

"The Australian Forestry Journal."—In the January number of this journal a writer points out that it is waste of good timber to ringbark the trees with the idea of getting a better crop of grass for grazing purposes. For some time he had taken particular notice of paddocks in which most of the trees had been rung, with the view of finding out what difference the killing of the trees made to the paddock, and, from the observations he has made, has come to the conclusion that more and better grass is to be found where trees exist than where there are none, or dying, the explanation being that the fallen leaves of the trees act as a mulch and fertilizer of the soil.

EXCURSION TO SHERBROOKE.

A BEAUTIFUL early autumn morning greeted the excursionists *en route* to Sherbrooke by the 8.50 a.m. train on Saturday, 15th March. The train journey was enjoyed. Although few plants along the line were in bloom, the grass lands, farms, gardens, and native vegetation look bright and green after the splendid summer rains. It was noted that plants of the Hop Bitter Pea, *Daviesia latifolia*, which is valued by some herbalists for its medicinal qualities, were still abundant between Bayswater and Boronia, though not so plentiful as formerly. After leaving Blackburn, plants of the Golden Spray, *Viminaria denudata*, were also still to be found surviving in the railway reserve near to Boronia station. The Leper Acacia, *A. leprosa*, which abounds between Upwey and Belgrave, gave promise of abundant flowering next spring. At Belgrave our party numbered seventeen in all, including our president and Miss Raff, whom we were pleased to welcome after her return the previous week from her holiday and studies in Europe. We passed through the township to the track which leads through the forest to the Sherbrooke Falls. Our excursion object being ferns, our attention was soon attracted to the various species prevailing along the track, and their distinctive characteristics were pointed out. The rough and soft tree-ferns of varying heights and girths of stems were readily determinable after journeying a little way along our path. The exceptionally tall growths and immense size of many of the White Mountain Ash, *Eucalyptus regnans*, and other timber trees, as well as of the Hazel Pomaderris, Christmas Bush, Prickly Currant-bush, Blanket Leaf, and Austral Mulberry plants were pointed out *en route*. Various mosses and lichens and small botanical specimens of the ferns were gathered by the members under authority of the permit obtained by the leader from the Secretary for Lands. About half a mile along the pathway to the Falls we were met, under arrangement, by Mr. A. G. Hooke, the Club's treasurer, who led us into a side track on the right up the hill and through a fine gully and dense bower of soft tree-ferns. On these ferns were remarkably fine growths of the Shining Filmy Fern, the Bristle Fern, and alongside the track were seen some splendid examples of the Leathery Shield Fern, Soft Water Fern, Tender Bracken, Necklace Fern, and Mother Spleenwort. Two large plants of the common garden Hydrangea, which had been planted in the vicinity of this track by the proprietor of Sherbrooke Lodge, were found to be growing luxuriantly. They bore numbers of large, rich, blue-coloured flowers as a result of the iron influence of the soil in which they were luxuriating. After passing through this grove the track led us out on to the eastern boundary of the main Sherbrooke Falls valley vegetation,

and through an area now covered with the Common Bracken, the most cosmopolitan of the world's ferns. After a journey of about half a mile we were guided by Mr. Hooke to the country house of one of his relatives, a Miss Billing, where, at about 1 o'clock, we were welcomed by that lady and Mr. Hooke, sen., and Miss Hooke, who had kindly prepared a very acceptable lunch for the party. This was partaken of under the shade of trees in the garden, and was greatly enjoyed by all. At its conclusion the leader and our president expressed, on behalf of the excursionists, sincere thanks for the extremely kind thought and action of Miss Billing. This was supported with enthusiasm by all the excursionists, who joined in singing, "For they are jolly good people." A photograph of the party was then taken as a memento of the occasion by Mr. Harvey. We then started for Clematis Avenue Gully, at South Sassafras. As we left the house, picturesque views of Olinda and Mernda were observable in the distance, and further along on our journey beautiful views in the direction of Nethania Springs, Monbulk, and the Gippsland mountains beyond were noticed as we passed by the well-kept gardens of the tourists' home of "Grendon" and the adjoining properties. After a pleasant walk of about a mile we reached the head of the gully, which was our objective. Some tall examples of our rough tree-ferns were very attractive objects as they stood along the valley roadsides as single specimens, or in groups of three and four, up to 20 or 30 feet in height. This Clematis Avenue Gully appears to be about half a mile in length, and eventually joins the Monbulk Creek. Good road approaches have been made which enable motorists and others to reach this gully from Belgrave and to make a round trip through Sherbrooke, Sassafras, and Ferny Creek districts to Ferntree Gully. We entered this gully from one of the highest of the many tracks leading from the road, and spent about 1½ hours searching for different ferns. The most interesting noticed here were the Shiny Shield Fern, The Shade and Weeping Spleenworts, the Austral Filmy Fern, the Batswing Fern, the Lance Fern, the Finger Fern, the Kangaroo Fern, the King Fern, and the Scented Polypody; the last-named was to be seen covering branches of the Sassafras and other gully trees, as well as the tree-ferns. Some fine examples were met with throughout the day of the common Shield Fern, with young plants developing in various stages at the tips of the parent fronds. One of our party obtained a number of mosses and fern specimens for University work. Minute plants of the Batswing Fern, showing distinctly the prothallus from which they were developed in each case, were obtained from a side bank of the road. As we left the gully at about 4 o'clock, a leisurely walk down the well-made

and nicely-shaded road to Belgrave enabled us to reach the station in time to catch the 5 p.m. train to Melbourne. A few of the excursionists remained for later trains. The weather was perfect, and a most enjoyable day was spent. The following is a complete list of the twenty-six ferns noted during the day. In view of the fact that nearly one-half of the species of Victorian ferns may be found in the Sherbrooke district, and the many changes recently made in their specific names, I have deemed it advisable to add to my report in tabular form the vernacular names of the twenty-six species observed during the excursion, with the new specific names, as well as the older and more familiar ones, in brackets.

Bristle Fern, *Trichomanes venosum.*
Austral Filmy Fern, *Hymenophyllum australe* (*H. javanicum*).
Shining Filmy Fern, *H. flabellatum* (*H. nitens*).
Soft Tree-fern, *Dicksonia antarctica* (*D. billardieri*).
Rough Tree-fern, *Alsophila australis.*
Shining Shield Fern, *Dryopteris decomposita* (*Aspidium decompositum*).
Ground Polypody, *D. punctata* (*Aspidium punctatum*).
Common Shield Fern, *Polystichum aculeatum* (*Aspidium aculeatum*).
Leathery Shield Fern, *P. adiantiforme* (*Aspidium capense*).
Rainbow Fern, *Davallia dubia.*
Shade Spleenwort, *Athyrium umbrosum* (*Asplenium umbrosum*).
Necklace Fern, *Asplenium flabellifolium.*
Mother Spleenwort, *A. bulbiferum.*
Weeping Spleenwort, *A. flaccidum.*
Gristle Fern, *Blechnum cartilagineum.*
Fishbone Fern, *B. discolor* (*Lomaria discolor*).
Lance Fern, *B. lanceolatum* (*Lomaria lanceolata*).
Soft Water Fern, *B. capense* (*Lomaria capensis*).
Common Maiden-hair Fern, *Adiantum æthiopicum.*
Tender Bracken, *Pteris tremula.*
Batswing Fern, *Histiopteris incisa* (*Pteris incisa*).
Common Bracken, *Pteridium aquilinum* (*Pteris aquilina*).
Finger Fern, *Polypodium Billardieri* (*Polypodium australe*).
Kangaroo Fern, *P. pustulatum.*
Scented Polypodium, *P. diversifolium* (*Polypodium scandens*).
King Fern, *Todea barbara.*

F. Pitcher.

ERRATA IN APRIL *NATURALIST.*

Page 236, exhibit by J. Searle—For "Apendicula" read "Appendicularia."

Page 244, line 2—For "throat" read "thorax."

NOTES ON THE NATYA DISTRICT.

By Chas. Oke.

(*Read before the Field Naturalists' Club of Victoria, 10th Mar.*, 1924.)

THESE few notes on the Natya district, while based on three short visits paid to the district in July, 1919, September, 1922, and June, 1923, may really be taken as a report of the Club excursion in September, 1922.

Natya is situated about 40 miles from Swan Hill, or 250 miles from Melbourne, and is about four or five miles from the Murray. In July, 1919, the Lands Department was advertising land as a soldier settlement in the parish of Pines, and as a friend of mine, Mr. J. Hann, was desirous of taking up land in the Mallee, we decided to go and have a look at it. So, on the 19th of July, 1919, we travelled by train as far as Piangil, then the terminus of the line. We spent the night in the train, as beds were not procurable in the town, and were awakened early by the noise of the other free boarders, mostly shearers making for early sheds in New South Wales. After breakfast we rolled our swags and set off for Possum Flat, where we expected to camp for a week or ten days.

The immediate vicinity of the town did not seem very inviting from an entomological point of view, but no doubt much interesting material might be taken quite close to the town, for just at the station entrance I caught the first beetle, *Onthophagus henleyensis*, Blackb., one of the small dung-chafers. Right in the main street were some logs, and on turning these over a number of *Talaurinus squamosus*, Macl., were obtained, this being the first Victorian record of this beetle.

On making inquiries at the coffee palace as to the most direct track to Possum Flat, we received quite a bewildering lot of advice as to "short cuts," but decided to go along the newly-laid railway line for a couple of miles and then get on to a track leading to our objective. Soon after leaving the railway line we got amongst the mallee, and from here on we hardly saw a break in the dense virgin growth. Some miles out we reached a small tank, and decided to have lunch. While my friend "boiled the billy" I had a look around. Every stick and piece of wood seemed to be harbouring several *Cubicorrhynchus granulatus*—they could have been taken in hundreds; but insects, other than ants, were scarce. Everything was very dry—in fact, it was practically a drought, as no rain had fallen, we were told, for over four months. Soon after leaving the tank we passed over a large sand-ridge, and gladly would I have spent some time here; but, being under promise not to hunt beetles until the tent was up, I had to abandon the idea. A couple of miles further on my friend

decided he must have a rest as soon as we reached the top of the next rise; but just before we started up this rise I noticed that there was a slight depression, about a dozen paces across, running along the base of the ridge, where the grass was nice and green. This was the only really green grass we saw in the district. I suggested that we take our rest there, and, to stop further argument, I dropped my swag at once and started hunting. Under a mallee root, within the green depression, I caught a fine blue specimen of *Eutoma tinctillatum*, Newm., and two specimens of *Chalcopterus picipes*, Macl., and, seeing a hole near the edge of another root, I dug it out, and caught a nice example of *Carenum elegans*, Macl. As this was the first one of the species I had taken myself, I considered it a real prize, and it certainly is a very fine insect, with its head and front of prothorax jet black, the rest of the upper surface dark green, and its "elegant" shape with beautiful lustre. Under a stick I got a Staphylinid that was new to science; it has since been described as *Lathrobium orthodoxum*, Lea, and several Polylobi were found amongst leaves and grass. A very pretty little Saprinus, metallic blue with coppery head and prothorax, was found running around a bit of dry bone. An Anthicid, *Formicomis kingi*, Macl., and the Carabs, *Parroa apicalis*, Sl., and *Tachys mitchelli*, Sl., were also added to the captures before time to move on was called. It is with regret that I think of this spot and the few minutes spent there. An hour's collecting would not have exhausted all its possibilities.

After this break we hurried on to Possum Flat, and started to put up the tent, when two returned men drove along in a light springcart. These were the first two to take up blocks in this area, and had only arrived a few days previously, and were camped in the scrub near-by. They offered to drive us over their blocks, so as to give us an idea of the country—an offer we gladly accepted, and so saw the first bit of mallee (about half an acre) rolled in the parish. The first block had an unusually high sand-ridge on it, and up this we went to have a look around us. This drive lasted over an hour, with the consequence that it was nearly dark when we returned to our unpitched tent, and so we had to finish putting it up by candle-light.

Just as dawn was breaking I heard a fox yelping, so, picking up the rifle, went after him, and, though I saw him, I could not get within shooting distance. After this I had a hunt around Possum Tank. Here I took four species of Amycterides —*Talaurinus squamosus*, Macl., *Pfalidura flavosetosa*, Ferg., P. (sp. ?), and *Cubi granulatus*, the latter being in great numbers. Three species of Clivina were obtained from holes in the bank, and a few small things were taken at the water's edge. Running

over and amongst leaves on the ground were numbers of two species of Laius, of the Malocodermidæ. After breakfast we visited the large sand-ridge, and I dug out a few young specimens of the large Mallee Cockroach, *Geoscapheus giganteus*; but by 9 o'clock I began to feel so queer that we decided to return to the camp, and soon after reaching it I collapsed with pneumonic influenza, and was half-dragged to bed, where I remained for three days, and was then brought into Piangil. That I lived to reach Melbourne is, I believe, entirely due to the attention I received from my friend, but his ideas of nursing would not commend themselves to the average doctor. His one idea was to keep me lively, and with that object in view tried to make me walk about, though he really pulled me around. The only thing of interest I saw near the town was a medium-sized eucalypt with hundreds if not thousands of a small leaf beetle on it. Unfortunately, I only took a few specimens, thinking it must be a common species, but it was then unnamed, and was described last year by Mr. Lea as *Monolepta arida*.

The Club excursion to Natya from 23rd September to 2nd October was arranged for the State-school holidays, and I thought there would have been a fairly large party; but, through the School Exhibition, the holiday was cut out, and the party dwindled down to two of us—Mr. J. E. Dixon and myself. Leaving Spencer-street at 8.30 a.m., we arrived in Bendigo at 11.40, and after an early lunch started off from there at 12 o'clock for Natya. The journey to Bendigo is too well known to need any comment. After leaving Bendigo there is a little timber to be seen till Raywood is passed, after which the country is a flat plain, almost treeless, or, excepting small clumps, quite so, until nearing Swan Hill. At first sight these plains seem devoid of interest, but to anyone interested in bird-life there is much to be seen, such birds at White Ibis, Straw-necked Ibis, Native Companions, Plovers, Dottrels, Wedge-tailed Eagle, Hawks, Crows, and Magpies being recognized from the train. Then there is Pyramid Hill. This is seen for miles, gradually resolving itself from a misty, nebulous mass into a sharp pinnacle rising abruptly from the plain, and then, as you pass it just before reaching the station called Pyramid, it appears to swing around, and discloses another mountain behind it, and then you see it gradually fading away in the distance as you pass on towards Kerang. Further on you see the lakes at Mystic Park, Lake Charm, and Lake Boga, where you are almost sure to see Black Swans, Duck, Teal, Coots, and perhaps other water-fowl.

In several places between Mystic Park and Swan Hill there are large clumps of prickly pear, Opuntia, on land that appears

to be of very little use. Surely this should not be allowed to remain. It may not be spreading much at present, but that is no guarantee that it will not become more virulent and start spreading rapidly. The lesson of the prickly pear in Queensland and New South Wales ought to be sufficient to make any Government see that it is not allowed to acclimatize itself in our State. Beyond Swan Hill the journey becomes very tiresome, and the four and a half hours that it takes to do the 40 miles is mostly taken up by the driver or guard "swapping yarns" with the station masters and other friends along the line.

Arrived at Natya, we were met by Mr. Hann, who had kindly offered to put up a party of the Club, and he was somewhat disappointed on finding out that only two had come. It was a beautiful, bright, starlight night, with a keen nip in the air that suggested frost, and we soon had all signs of drowsiness blown away as we bowled along at a smart pace to Mr. Hann's house, a distance of six or seven miles, and two and a half miles beyond Possum Flat.

Sunday morning we were astir early, and wandered around the house and its sheltering patch of scrub, consisting of White Mallee, three Acacias, and Turpentine-bush, with, of course, a sprinkling of smaller shrubs, and, on a patch of sand, the Porcupine-grass. One of the first things to attract the eye were the numerous raised-up little mounds of fresh earth, or, as they were more often on the sandy patches, sand. These were about eight or nine inches high, and about four or five inches across, and were the result of the burrowing of our largest Victorian dung-chafer, *Bolboceras sloanei*, Blkb. These go down eighteen inches to two feet, and require some effort to dig out. The first thing we thought of looking for were Carenums, and, as we were both armed with strong trowels, we were soon busy digging out burrows. Some species seem to have their holes out in the open—that is, away from cover—*e.g.*, *C. elegans*, Macl.; but they are mostly near fallen Mallee, or leaves or sticks. This is rather a tedious pastime, digging in the hard ground, as some of them go down from six to nine inches, and up to two feet along, and when you get to the end, where there is generally a small chamber, you very often strike a "dud," or worse still, when inexperienced, the large cockroach, *Geoscaphus gigantcus*, popularly known as the "Mallee Turtle." On the sandy patches it is rather difficult to follow the tunnels, for, though you push a thin stick into the tunnel, they often turn off at almost right angles, and you dig past without seeing the hole, which, of course, easily fills with the sand.

I suppose it was due to this that the following incident

occurred:—I saw a Carenum sitting in the entrance to a burrow, and made an unsuccessful attempt to cut off his retreat with the trowel, so I carefully pushed a stick down and started digging, and after I had dug about five feet along a tortuous course, and over a foot deep, I saw something wriggling in the sand, and thought I had found it, but, on lifting it out on the trowel, found it was a lizard, *Hetronota binoei*, Gray, a pretty mottled little species in liver and white. Just where I lost the original tunnel and got into the wrong one I could not find out.

Tiring of watching us digging, our host suggested a walk down to his tank and the water-channel. Between two patches of crop he has left a strip of about 50 yards. One end of this is a patch of hop-bush, and intermingled are a few fair-sized eucalypts. Here, amongst some old hop-bush stumps, we obtained a few specimens of *Eutoma tinctillatum*, Newm., and *Chalcopterus picipes*, Macl.; this is the only species of Chalcopterus that, in Victoria, seems to be habitually on the ground, and I have not heard of this species being taken under bark or on tree-trunks, as other species are. In the small branches of the hop-bush we found two species of Belus breeding, as also was *Stigmodera parallela*. Eventually we were persuaded to leave the hop-bush, and, rather than trust us in the scrub, our host suggested cutting across the crop for the tank. Here we obtained a few small things near the water, such as *Bembidium jacksoniense*, Guer., *Notophilus gracilis*, Blackb., *Trogophlæus punctatus*, Fvl., and some water-beetles. Under a log were a number of small Tenebrionids and a number of small weevils. I was quite pleased with the later until it suddenly dawned on me that they were the wheat weevil.

Mr. Hann decided to leave us and go back to cook the dinner, and made us promise to be back by 1 o'clock sharp. Mr. Dixon and I decided to follow along the channel to the scrub, and so back to the house, about a mile, collecting as we went. Turning over Mallee roots, we got a few more beetles, a fine *Pterohelæus blackbourni*, *Semanopterus convexiusculus*, and *Eutoma* (*Carenum*) *gratiosum*, Sl. -a real prize. This was described from a specimen in Mr. C. French's collection, and, though it was labelled as "Mallee, Victoria," Mr. Sloane has since cast doubt as to the habitat being correct.* This is apparently only the second specimen to be found. Beating some Acacias, we obtained several small weevils, including a species of Myllocerus, also a Lemidia, but were surprised at not getting a single Melobasis. On some Purple Daisies, *Stigmodera elongatula* and *S. flavopicta* were obtained, while several attempts to catch a beautiful silvery Syrphid fly were unsuccessful.

* Proc. Linn. Soc. N.S.W., vol. xxv. p. 383

Returning towards the house through the scrub, we came across two very fine trees of the Bitter Quandong, or Ming, *Fusanus* (*Santalum*) *persicarius*, F. v. M., laden with fruit. We had to cross a sand-ridge, and on this we saw the first pines. Hitherto it had appeared as though the parish had been named, like Possum Flat, from an absence of its namesake. Here we also saw our first bull-ants' nest. These ants, *Myrmecia vindex*, Sm., var. *nigriceps*, Mayr., are very fierce, and when I stamped on the ground, a foot away from the nest, they all came tumbling out in a great hurry and fury to defend the home against all comers. Only two nests were seen in the district, and they were both the same size and shape. They appeared as though they had been raised up in a perfect cone, and then undermined in the centre, so that it had fallen in, leaving a crater-like structure. The sides were over two feet high and about 14 or 15 inches across at top. Two or three hundred ants must have come out of this first nest, and all had black heads and abdomens, the rest a pale yellowish-brown. We got back soon after three, and found dinner ready, and nothing was said about the two hours we were late. We had accepted an invitation from Mr. and Mrs. J. Ferguson to go over to their house to tea; so soon after dinner the three of us drove over. The track passed through Possum Flat and the Natya Station to about a mile beyond. Now it was daylight, what a difference was to be seen in this track from when I had walked over it in 1919! Large paddocks of two or three hundred acres without a single tree, and rolling going on all the time! One settler who has 700 acres has only one tree left—his house (?) leans against it—on his holding.

Monday morning was dull and rather close, and we went over the road to some large sand-ridges. Here I was surprised to find the Dotted Sun-Orchid, *Thelymitra ixiodes*, Sw., growing in great profusion, as also was the Fringed Spider-Orchid, *Caladenia dilatata*, R. Br., and a few specimens of a Pterostylis unknown to me. Some ant nests were searched carefully for inquilines, but, with the exception of a small Ctenisophus, with *Iridomyrmex rufoniger*, nothing was found. Amongst the clumps of Porcupine-grass pieces of a Scaraphites were common, but it was not till the Thursday that I caught a live specimen, and found it to be *S. hirtipes*, Macl. The most common insect here appeared to be the pretty Bombylid fly, *Neuria apicalis*, Macq. Pieces of Mallee an inch or more in thickness, broken down and lying on the ground, were very plentiful. The roots below were carefully grubbed out, and found to contain the larvæ of a longicorn beetle. A number of these were brought home, and from them a large black-and-white species of Hesthesis was bred out. In the afternoon we went to Possum

Flat, and here, in a nest of *Iridomyrmex gracilis*, I obtained a single specimen of Daveyia, probably *mira*, Lea. This beetle was named from specimens obtained at Geelong and Portland by Mr. H. W. Davey, and this is an interesting extension of its distribution. Insects were not as numerous as we had expected; still, we managed to get a few interesting specimens, including Trogophlæus, sp. n. (?), *Lathrobium exigium*, Blkb., *Pæderus cruenticollis*, Germ., var. (?), Eupinoda, sp. (?), Ctenisophus, sp. (?), Clivina, two species, *Bembedium jacksoniense*, Guer., *Mecyclothorax punctatus*, Sl, *Pfalidura flavosetosa*, Ferg., and several water-beetles. Ants were numerous, but, with the exception of a pale species of Camponotus, perhaps a form of *nigriceps*, were only small, common species. Flying around some Dodder-Laurel were several specimens of *Candalides hyacinthina simplexa*, one of our Mallee Lycænid butterflies. Shaking the tangled masses of Dodder-Laurel into the umbrella in search of the *simplexa* larvæ only produced negative results, but a most interesting spider, belonging to the Argiopidæ, with two large humps on its back, was caught.

Towards night it became very hot, and while we were having dinner it reached 98° in the dining-room. Numerous insects came in to the light, including a number of species either found in or near water, such as Clivina, Trogophlæus, Blædius, Bidessus, Copelatus, &c. This surprised me, as there was no permanent water nearer than Possum; but next morning, on unpacking some sheets of fibrous plaster from Lake Boga, the mystery was explained.

The next three days were spent near the house, and several interesting finds were made, the most interesting being, perhaps, a Terbrionid inquiline, *Thorictosoma tibiale*, Lea, from the nest of *Euponera lutea*. This has only recently been described from two specimens taken in Western Australia. Another Western Australian insect found was Clark's Jumping Bull-Ant, *Myrmecia clarkia*, Craw., also recently described. Ants were very numerous, especially on the flats. *Iridomyrmex detectus* and *Camponotus nigriceps* had their nests in every direction, while two species of Crematogaster were also very numerous. One of the most interesting species found was a Meranoplus. This ant, which is less than a quarter of an inch, has a peculiarly-shaped head and a remarkable thorax; the latter, at a glance, seems to be nothing but spines. *Podomyrma adelaidæ* were fairly common, running in and out of their nesting-holes in twigs, especially in the "Wait-a-While," *Acacia colletioides*. Several species of Iridomyrmex were seen, the most common being *detectus*, while its var., *viridianeus*, Vich., was also common. Of Pheidole only a few were seen, and only two nests found. Three species of Thynnid and one Vespid

wasp, with a few Chalcids, were the only other Hymenoptera taken. Very few species of Lepidoptera were seen, *Junonia vallida* being the only butterfly, besides the one already mentioned, that was seen. From the White Mallee, *Eucalyptus gracilis*, two larvæ of *Hyleora eucalypti*, Doubl., were taken. These pupated on the 4th and 10th October, and emerged on 3rd and 7th April, and, fortunately, were male and female. The commonest moth was a very pretty little black-and-yellow Pyralid, on the Desert Cassia, *C. eremophila*.

Orthoptera were represented by a small black cricket, a few small, immature grasshoppers, and one imagine of *Chortoicetes terminifera*, Walk., and three or four species of cockroach, including the large "Mallee Turtle," *Geoscapheus giganteus*, Tepper. This large cockroach is about $2\frac{3}{4}$ inches long and $1\frac{1}{2}$ inches wide, and of a bright reddish-brown; is wingless, and has the front legs admirably adapted for digging. Its egg capsule is about three-quarters of an inch in length. These cockroaches were very plentiful, and one morning, after a shower of rain overnight, they were running about the flat the house is on in such numbers that a hundred could have been caught in less than an hour. The same morning I took the gun to try for a rabbit on one of the sand-ridges without success, but on passing over the ridge to the flat beyond I saw two foxes running around amongst the Mallee and picking up something and eating it. On getting a little closer I saw they were eating these cockroaches. Unfortunately, the foxes were too far apart to get but the one, the vixen. So she will eat no more 'roaches or birds.

Coleoptera was our chief desire, and this partly accounts for the fact that we obtained far more species of this order than all the other orders put together. There was no need to go far, for a morning spent in a few acres produced several interesting beetles, all "new to me," and, just to name some, I might mention these few: *Quedius andersoni*, Blk., Conosoma, sp. (?), *Eupines concolor*, Sharp, Eupinoda, sp. (?), Pselaphophus sp. (?), Arthropterus, sp. (?), *Sarticus dixoni*, Sl., *Carenum versi color*, Sl., *Cerolalis semiviolacea*, Cast., Gigadema (three species), *Adelium goudiei*, *Chalcopterus leai*, Blkb., *C. longscutilus*, Blkb., *C. lepida*, *Trox cyrensis*, Blkb., *Haplonycha carinata*, Blkb. (?), *H. bicolor*, Blkb., *H. opaca*, Lea, *H. pectoralis*, Blanch., Byromorpha, sp. (?), Cryptodus (two species). On this flat a small land shell occurs belonging to the genus Pupina, which Mr. C. Hedley informs me is new to science. We saw very few reptiles, two or three Blue-tongued Lizards (Tiliqua) and the same number of the Bearded Lizard, *Amphibolaurus barbatus*, Cuv., and Fraser's Delma, *D. fraseri*, being the only lizards, and only one snake, the Brown, *D. textilus*.

Entomologists do not need to cover much ground while collecting. Still, we thought a day at the river might prove both enjoyable and profitable, so we decided to go there on the Friday. We left about 8 o'clock in the morning, but did not reach the Murray until after 12, as we did not know to cut through some paddocks. Where we stopped and had lunch the river ran between high banks, and I doubt if it ever overflows, but half a mile lower down were some typical Murray flood-flats. Fairly soon after starting to collect I turned over a small log that was covering the nests of *Euponera lutea* and Iridomyrmex, sp. (?). Right between the two nests I saw a small beetle, since named *Orectsceles bifoveicollis*, Oke. In the nest of *Euponera lutea* were some *Eupines flavoapicalis*, Lea, and several specimens of a Microchætes, while over twenty specimens of *Diphobia familiaris*, Oll., were obtained from a nest of *Camponotus nigriceps*. The flood-flats were very dry when we were there. If there had been more moisture about it would have been better for us; but, even as it was, there were some nice things to be taken, including the following species of Staphylinidæ: *Cryptobium elegans*, Blkb., *Lathrobium australicum*, Sol., *L. orthodoxum*, Lea, *L. mutator*, Fvl., and its var. *bipartitum*, *L. gratellum*, Fvl., *Scopæus latebricola*, Blkb., *Scymbalium australe*, Fvl., *Domene torrensis*, Blkb., *Quedius luridipennis*, Macl., Leptacinus, sp. (?), *Neobisnius procerulus*, Grav., *Eulissus chalcopterus*, Er., *E. phœnicopterus*, Er. It was strange, considering the dryness of the ground, that there should have been so many Staphylinidæ, but no doubt it is the occasional overflowing of the Murray that attracts them.

Under the bark of logs were numerous long, thin, spotted Scorpions. These were very close to Keyserling's figure of *Isometrus maculatus*, De Geer, but the apical segment of the tail is shorter and broader, and the spine not so acutely curved. Under the bark of the River Gums beetles were very scarce, but we got a few Chelifers and spiders, also several Marbled Geckos, *Phyllodactylus marmoratus*, Grey, were seen; perhaps they had cleaned up the insect life. Termites were in every piece of dead wood, even in pieces that had one end in the water, and, although they were carefully searched for inquilines, the only result was three specimens of a species of Aleocharides (Staphylinidæ) unknown to me. About two hundred yards from the river some clumps of Mallee were just coming out in flower, and from these a few small weevils were taken, including *Lybæba pretiosa*, Lea, two species of Lemidia, and a species of Ditropidus. On digging out a burrow under this Mallee, a fine example of *Philoscaphus tuberculata*, Macl., was obtained. We stayed at the river till dark, and got back home at 10.30, well satisfied with our day on the Murray.

Saturday morning we visited a sand-ridge near the house, and here we took *Euryscaphus dilatatus*, Macl., *Astræus mastersi*, Macl., *Sclerorinus goudiei*, Ferg. (?). About 10 o'clock it rained very heavily, and we got drenched before we got back. It was not till four that it cleared sufficiently for us to venture forth again for a final look around the water-channel. We had barely reached there when it rained again, and we returned drenched to the skin. And this in a part of the country where, according to local tradition, "it never really rains"! Sunday was mostly spent in gathering flowers for the Club's wild-flower show. An early start was made for the train on Monday morning, and it was just light enough as we crossed Possum Flat to see the pretty patch of *Kochia triptera*, and long for another day, especially as we remembered we did not have a good look for small insects amongst this Three-winged Blue-bush or the patch of *K. brachyptera* (?) a little further on. On arrival at the station we found we had twenty minutes to spare, so we made a hasty search around the station. In a nest of the Green-head Ant, *C. metallica*, three Polylobi, a Microchætes, and a small black Trichopterygid were obtained, and from a bush of *Daviesia genistifolia* a pretty little Monolepta was taken, while under some old bags were several Anthicids.

My third visit was made on 23rd June till 26th June, 1923, which, of course, only left two days for collecting. The conditions this time were very different from the first visit, although it was only a month earlier in the year. Then everything was dry, and the earth on the flats crumbled into dust on being touched. Now the flats were just like so much mud, with water in every little depression, so it made collecting rather difficult. I was particularly anxious to obtain some more of the little land shells, Pupina, sp. (?), but, though I dragged around a couple of bags to kneel on, and looked well amongst the leaves and rubbish, I could not see a sign of one. The rain had evidently swamped out numbers of a small scorpion from their retreats. I had not seen this species on my former visits. It is similar to the common species in the Dandenongs and around Melbourne, and is probably only a form of that species. They were so numerous amongst dead leaves that it was necessary to exercise great care in handling them. *Quedius andersoni*, Blk., was now fairly abundant, as also were a species of Conosoma, and a species of Polylobus, near *longulus*, Oll. I spent nearly an hour watching a solitary Jumping Bull Ant, *Myrmecia clarki*, Claw., to see where its nest was, but it would not go to it. Opening a nest of the Green-head Ant, I got three small white crickets, and two in another nest. Very little fresh material was found around the house, but on the Monday I went to Possum Flat and got a pair of the Bombardier Beetle,

Pheropsophus verticalis, Dej. This beetle makes a fairly distinct sound when it "bombards," and apparently five or six "shots" is its limit, and then it has to wait three days before firing again. Such was my experience with this pair. Here I also caught a most interesting little "squeaking" weevil. I know of two other weevils that "squeak" when caught, but this one is by far the best "squeaker." My specimens vary in size from $3\frac{1}{2}$ to 7 mm., 6 mm. being the usual size, and are of a light stone colour, with dark brown mottling on back, and coarsely punctured. Under a piece of tin was a specimen of *Catadromus australis*, Cast., and the only Scydmænid I have from the district, Heterognathus, sp. (?), was obtained from the nest of *Iridomyrmex rufoniger*.

Tuesday morning I returned to Swan Hill, and had the afternoon to devote to collecting along the river. The Victorian side is without a sign of trees, but on the New South Wales side there is a single row of trees growing. Stripping the bark off these was rather tiresome, as nearly every piece had a swarm of ants under it—a small blackish species of Iridomyrmex. They were there in thousands, but, so far as I could find, without inquilines of any kind. Three species of Staphylinidæ were very common—namely, *Scymbalium arcuatum*, Fvl., *Pinophilus rufitarsis*, Fvl., and *Lathrobium australicum*, Sol., while single specimens of *Scybalium australe*, Fvl., *S. duplopunctatum*, Fvl., *Cryptobium elegans*, Blkb., and *Neobisnius procerulus*, Grav., were all taken under the bark of these trees. From nests of Iridomyrmex under tins and pieces of wood I took a few *Articerus constrictiventris*, Lea, apparently a rare species, as no complete male has yet been described. The armature of the intermediate tibiæ is very similar to *A. nitidicollis*, Raff. Another specimen of *Eupines concolor*, Sharp, was also taken, and I saw a Pselaphid with a general appearance of *Batraxis armitagei*, King, but more robust, which, I regret, escaped me through someone coming up to me to find out what was wrong. (I'm sure this man still thinks I am "dippy.") A few small weevils and some common Carabs, including in the latter *Catadromus lacordairei*, Boisd., and the Bombardier Beetle previously mentioned, were about all I could find before the daylight faded away, and, having used my box of matches, I had perforce to make my way the best way I could along the mud-channel that served as a road to the hotel.

Much interesting material could, no doubt, be gathered around Swan Hill, and the conditions that are there to-day are likely to remain for years to come. But at Natya it is very different. Each year sees large tracts of Mallee rolled and burnt, and in a few years all this district will be open, undulating country, without a patch of scrub anywhere, with only a narrow fringe

of Mallee on either side of the road left for anyone to see what used to grow all over this parish. Even the fringe on the roads, which are few and far between, has an unhappy existence, because, as the centre of the track becomes boggy after rain, the road is either widened or a fresh track made. Of course, all this clearing of the Mallee is good progress for the country, but it hurts the naturalist to see all the natural growths disappearing so rapidly, and with it going the birds disappear, and species of land mollusca and Arthropoda become extinct without having been recorded, as some of these are probably very local.

There can be very little doubt that some of the insects herein mentioned are distributed over a small area only; others extend right through the Mallee, a few east and north, and some right through to Central and Western Australia, while only four of the beetles, *Catadromus lacordairei* and *Scymbalium arcuatum*, *Pinophilus rufitarsis*, Fvl., *Stigmodera flavopicta*, Boisd., and four of the ants, *C. metallica*, *Iridomyrmex rufoniger*, *I. gracilis*, and *Camponotus nigriceps*, mentioned occur, or are known to occur, near Melbourne. Of course, there are plenty of insects common to both localities, but I have refrained from mentioning these. In the three trips I have taken 245 species of Coleoptera.

It is interesting to compare the list of Coleoptera of the Sea Lake district by Mr. Goudie * with mine, from Natya. Several in some families are missing from one or the other. Iridomyrmex, the best ant for inquilines, I have not been able to find in the Natya district, though Mr. Goudie finds it in great numbers around Sea Lake. Mr. Goudie has had the advantage of living for years at Sea Lake, while my trips to Natya have only been hurried visits; but I have hopes of being able to re-visit Natya and continue my investigations of its insect life. I am greatly indebted to Mr. A. M. Lea for identifying most of the Staphylinidæ, and to Mr. J. Clark for identifying some of the ants, and to both I tender my thanks.

SOME EAST GIPPSLAND NOTES.—A brief holiday of six days towards the end of February afforded me the opportunity of visiting a portion of Victoria of which I previously had little knowledge. My first objective was Nowa Nowa, at the head of Lake Tyers, about 210 miles from Melbourne. During an early morning ramble some nice specimens of *Isotoma axillaris*, the Rock Isotome, were noticed. This plant is not recorded from the eastern ("E.") division in the "Census." From

* Goudie, J. C., "Coleoptera of North-West Victoria," *Vict. Nat.*, vol. xix., p. 41.

Nowa Nowa we visited the Buchan Caves, and along the road saw several plants growing in their native habitat for the first time. That curious composite, *Humea elegans*, Plume Humea, occurred at one or two places, but, being past its best, its "plumes" had lost the pink tinge which earlier in the season renders them attractive. "Native tobacco" was the name given them by a resident, evidently from their large tobacco-like leaves, which are somewhat sticky and aromatic. The twiner *Kennedya rubicunda* was noticed climbing up the saplings or over the bracken in many places, its large trifoliate leaves being rather handsome. Buchan Caves—or, rather, the two we visited, the Fairy and the Royal Caves—we considered well worth the trip, and we were glad to find that Buchan is becoming well patronized as a tourist resort. A charge of two shillings and sixpence per head is made by the Government for all visitors entering a cave, this amounting to an average of £40 to £50 per week, while on one day during Christmas week three hundred visitors were shown through the Caves. The Caves contain all the forms of stalactites, stalagmites, &c., usually seen in limestone caves, together with shawls, mysteries, &c. The formations are perhaps not on such a large scale as those of Jenolan, N.S.W., but they are equally beautiful, and worthy of inspection. A large sum of money has been spent by the Government in opening up the Caves and making the passages more roomy. Electric light is available for showing off the many beautiful features to the best advantage. There are several other caves besides the two visited, and, as further exploration is going on, there are great possibilities ahead. Buchan itself is well situated overlooking the valley of the river of the same name—a rushing stream with a pebbly bed, on its way to join the Snowy. A rather weird sight along the road was a small forest of glaucous-leaved gum-trees, *Eucalyptus cinerea*, F. v. M., Mealy Stringybark. These had a very singular appearance as we drove through them. Many other strange plants and shrubs were seen, but "motor botanizing" is a somewhat difficult matter. Next day, on the way to Lake Tyers Entrance, we saw quantities of the Sunshine Wattle, *Acacia discolor*, which a few weeks later would be displaying its fluffy yellow balls for the benefit of passers-by. The road (portion of the Prince's Highway) crossed an arm of the lake, and in a cutting could be seen fairly large marine fossils, awaiting the hammer of the collector. Tree-ferns were not so numerous as had been expected, but here and there a few occurred. Lake Tyers, with its many arms and bays, offers the explorer endless beauty spots, while the naturalist will find many objects of interest. At Lakes Entrance we found Mr. T. S. Hart's admirable paper in the

October (1923) *Naturalist* most useful as a guide. Here the high bank on the northern side of the North Arm was botanically most interesting, and introduced me to several plants known to me only from dried specimens. The concluding part of our trip, across Lake King and up the Mitchell River to Bairnsdale, was noteworthy from the remarkable "silt jetties" between which the river makes its way into Lake King; these were well illustrated in Mr. Hart's previous paper on the physiography of the Lakes in the *Naturalist* for December, 1921. The trip, on the whole, was a most enjoyable one, made all the more interesting by having such papers as I have referred to as guides on our wanderings: hence the value of papers of a similar character for the benefit of future travellers. —F. G. A. Barnard.

A.A.A.S.—The sixteenth volume of the Proceedings of the Australasian Association for the Advancement of Science, being the record of the Wellington, N.Z., meeting in January, 1923, has been issued during the month. The volume extends to 872 pages, and contains, in the various addresses, reports, and papers, evidence of a great amount of painstaking research in various directions. The report of the Ecology Committee contains a useful bibliography of Australian floristic and ecological plant-geography. The Mueller medallist for the year 1923 was Mr. J. H. Maiden, I.S.O., F.R.S., F.L.S., well-known for his valuable contributions to Australian botany, and who has recently retired from his position of Government Botanist of New South Wales and Director of the Botanic Gardens, Sydney. The next meeting of the Association will be held in Adelaide during August next.

Sagacity in a Kookaburra.—A recent Nature note in the *Argus* says:—"At Traralgon Dr. Hagan got a young Laughing Jackass (Great Brown Kingfisher) from a nest about four weeks ago, the nest being about three miles out of the town. It took the old birds three weeks to locate the young bird in the doctor's garden, but they did it, and Mr. Tom Fisher says that they have been rather surprised at the quantity and variety of the food brought to the youngster. In one morning the old bird brought two big yabbies, a half-grown bush rat, and an eel 6 inches long, before midday. During the afternoon the youngster was fed wholly on frogs, and Dr. Hagan remarks upon the manner in which the old birds vary the diet. On one day they will fetch nothing but young Sparrows or other small birds, the next day frogs only, and perhaps on the following day exclusively mice. Some days he notices that they bring in nothing but small Blackfish. This is a very interesting observation, and suggests that keeping pet birds on a regular diet through the year must soon affect their health."

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— OF —

The Field Naturalists' Club of Victoria.

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Hon. Editor: F. G. A. BARNARD, Esq

The Author of each article is responsible for the facts and opinions recorded.

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1924.

Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE.

BUSINESS PAPER FOR ANNUAL MEETING

MONDAY EVENING, 16th JUNE, 1924.

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBER—	PROPOSER.	SECONDER.
Mr. W. R. Cottman, 54 Point Nepean-road, Elsternwick.	Mr. J. W. Audas, F.L.S.	Mr. P. F. Morris.

3. Nominations for Membership.

4. General Business.

1. Consideration of Annual Report and Balance-sheet.
2. Election of Office-bearers for 1924-5.

Nominations :—

President :—Mr. J. Searle.
Vice-Presidents (Two) :—Mr. G. Coghill; Mr. E. E. Pescott, F.L.S.; Mr. F. E. Wilson.
Hon. Treasurer :—Mr. A. G. Hooke.
Hon. Librarian :—Dr. C. S. Sutton.
Hon. Editor :—Mr. F. G. A. Barnard.
Hon. Secretary :—Mr. C. Oke.
Hon. Assistant Secretary and Librarian :—Mr. H. B. Williamson, F.L.S.
Committee (Five to be elected) :—The rejected candidate for Vice-President, and Messrs. F. Cudmore, J. A. Kershaw, F. Pitcher, A. E. Rodda, and L. Thorn.

5. Remarks by Exhibitors relative to their Specimens.

Ten minutes' adjournment for discussion of Exhibits.

6. Reading of Paper and Discussion thereon.

1. By Mr. C. Daley, B.A., F.L.S. Presidental Address.
2. By Mr. A. J. Tadgell. The Bogongs and Its Flora.

The committee will be pleased to receive promises of papers for future meetings.

7. Reading of Natural History Notes.

Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and *Naturalist*. Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Club year ended on 30th April last. Any subscriptions overdue should be forwarded to the Hon. Treasurer *at once*.

Subscriptions for the year 1924-5 became due on 1st May, and must be paid on or before 16th June to entitle voting at the annual meeting on that date.

SPECIAL NOTICE.—The attention of members is directed to item 8 of business paper. Notices of exhibits should, if possible, be type-written.

The Victorian Naturalist.

Vol. XLI.—No. 2. JUNE 5, 1924. No. 486.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 12th May, 1924.

The president, Mr. C. Daley, B.A., F.L.S., occupied the chair, and about forty members and visitors were present.

REPORT.

A report of the visit to the Biology School, Melbourne University, was given by the chairman, who said that about twenty-five members of the Club had taken part in the visit, and had spent a pleasant and profitable afternoon. Professor W. E. Agar, M.A., F.R.S., invited the party into the lecture-room, where he gave a short statement of the Mendelian theory of inheritance. He based his remarks on a number of skins of domestic fowls of the Rhode Island Reds and Plymouth Rock breeds, and the progeny of interbreeding the two forms, in which it was clearly shown which were the dominant and which the recessive characters. The party then visited the laboratory, where a number of interesting exhibits were on view, which were explained by Prof. Agar and Mr. P. C. Morrison, B.Sc.

ELECTION OF MEMBER.

On a ballot being taken, Miss MacGeachy, "Deepdene," Burke-road, Balwyn, was duly elected a member of the Club.

GENERAL BUSINESS.

Mr. F. G. A. Barnard drew attention to the reported diminution of Mutton-birds at Phillip Island owing to the destruction of their nesting-places by the shifting sand. He had been present at a recent meeting of the National Parks Association, when Mr. F. Lewis, the Inspector of Fisheries and Game, had stated that, unless steps were taken to plant marram-grass to stay the sand, the greater portion of the "rookeries" on the island would be destroyed.

On the motion of Messrs. Barnard and French it was decided to write to Mr. Thomson, Cowes, asking his advice in the matter.

The president drew attention to the very great loss a member, Miss A. Fuller, had just sustained in the very sudden death of her brother, and moved that a letter of sympathy be forwarded to her. This was seconded by Mr. F. G. A. Barnard and carried in silence, all standing.

Messrs. F. Pitcher and A. J. Tadgell were elected to audit the accounts of the Club for the year 1923–4 just closed.

PAPERS READ.

1. By Mr. J. C. Goudie, entitled "Notes on the Coleoptera of North-West Victoria," Part XI.

In this part the author dealt with the families Tenebrionidæ, Cistelidæ, Melandryidæ, and Anthicidæ, the first-named family being the most numerous in the Mallee country around Sea Lake. The fact that only 47 species of Tenebrionidæ were listed, while Australia is credited with over 1,000 species, indicated an arid climate and the absence of wooded areas. Only three species appeared to be peculiar to the district, while several of the others are to be found throughout Western New South Wales, South-Western Queensland, and in South Australia—in fact, almost wherever "Mallee" conditions prevail.

In the absence of the author the paper was read by Mr. F. G. A. Barnard, who, with Mr. C. Oke, remarked on some of the beetles mentioned.

2. By Mr. P. F. Morris, entitled "A New Species of Brachycome."

The author described as new to science a species of Brachycome found by Mr. H. B. Williamson, F.L.S., on the Bogong plateau, North-Eastern Victoria, at an altitude of about 4,000 feet. The plant is only two to three inches in height, and resembles a small form of *B. scapigera*, D.C., but the achenes are not winged as in that species. The ray florets are pale lilac or light blue.

Messrs. Williamson, Pitcher, and Heber Green remarked on the interest of the locality and its plants.

3. By Mr. L. B. Thorn, entitled "Notes on the Life-Histories of Some Victorian Lycænid Butterflies."

The author, by means of specimens and drawings, briefly indicated the differences between butterflies and moths, and then the position of the Lycænidæ in the usual classification of butterflies, of which he said Waterhouse and Lyell, in their work, "Australian Butterflies" (1914), recorded eighty-nine species for Victoria. Of these, twenty-nine species belonged to the family under notice, popularly known as "blues" and "coppers," so called on account of their bright metallic colourings, giving first of all the grouping of butterflies and a sketch of a typical life-history. The author then dealt with eight species—three belonging to the sub-family Ogyrinæ, three to Miletus, and two to Ialmenus. Attention was called to the remarkable fact that the caterpillars of the Lycænidæ are nearly always attended by ants—some by one species of ant, some by another; but a definite reason for this action has yet to be discovered, beyond the fact that the caterpillars secrete a fluid

of which the ants are very fond. Owing to their habits the butterflies of this group are difficult to capture, hence rearing the caterpillars is usually adopted by collectors, though with some difficulty, on account of the necessity for providing the ants usually associated with them.

Messrs. Searle, Barnard, and Oke remarked on the interest of this association of two such dissimilar orders of insects and other points in their life-histories.

EXHIBITS.

By Mr. C. Daley, B.A., F.L.S.—Water-worn pebbles from Latrobe River gravels, Victoria.

By Mr. P. F. Morris.—Dried specimens of *Brachycome alpina*, sp. nov., found at Pretty Valley, Bogong Plateau, by Mr. H. B. Williamson, F.L.S., January, 1923, in illustration of paper.

By Geological Survey of Victoria, per Mr. A. E. Rodda.—Coorongite, from Lake Coorong, South Australia. This substance has been the subject of considerable discussion amongst geologists, as by some it has been thought to be a process in the formation of petroleum, but this view is now generally opposed. It is a dark-coloured gelatinous material of the appearance and consistency of crude rubber. It is inflammable on account of its oil content, and burns with the characteristic smoky flame and odour of burning oil. Coorongite occurs in the dried-up portions of shallow fresh-water or brackish lakes, such as Lake Coorong, in South Australia (from which it takes its name), in the form of flattened masses or sheets, and is now generally considered to be a product of the decomposition of fresh-water algæ.

By Mr. W. H. A. Roger. Stones found in the sand and river gravel forming the bed of the Fitzroy River, about 60 miles from Rockhampton, Queensland.

By Mr. J. Searle.—Under microscope.—Blood smears—(*a*) avian blood (normal); (*b*) avian blood (pathological); (*c*) human blood (normal); (*d*) human blood (pathological); the avian blood (pathological) showing an abnormal number of polynuclear leucocytes, eosinophil leucocytes, and myelocytes.

By Mr. L. B. Thorn. Victorian Lycænid butterflies, &c., in illustration of paper.

By Mr. H. B. Williamson, F.L.S.—Specimen of Long-tongue Greenhood Orchid, *Pterostylis grandiflora*, R. Br., collected by exhibitor at Newstead, 4th May, 1924; microscopic slides of flowers of the rare orchid, *Prasophyllum ciliatum*, Ewart and Rees, collected by exhibitor at Newstead, 4th May, 1924.

After the usual conversazione the meeting terminated.

The following exhibits should have been included in the report of the April meeting, May *Naturalist*, page 3 :—

By Mr. C. Daley.—Spear-heads from Kimberley district, North-West Australia.

By Mr. J. R. Leslie.—A representative collection of Tasmanian mosses.

By Geological Survey of Victoria, per Mr. A. E. Rodda.—Fossil fruits in brown coal, from Lal Lal, Victoria.

By Mr. A. J. Tadgell.—Flowers of Ploughshare Acacia, *A. vomeriformis*, grown at Sandringham (plant obtained at Grampians).

ERRATA IN MAY *NATURALIST*.

Page 2.—Line 5 from bottom –for "Rhymil" read "Rhynie."
Line 4 from bottom—for "*Rhznia*" read "*Rhynia*."
Line 3 from bottom—for "foranimifera" read "foraminifera."
Line 1 from bottom –for "Coldaren, Farol Channel," read "Cold area, Faröe Channel."
Page 3—Line 18—for "Eulimnidia" read "Eulimnadia."
Line 19—for "Strickland" read "Stickland."

Ballarat Pine Plantations. –Considerable space is given to an illustrated article in the *Australian Forestry Journal* (Sydney) for January on the tree-planting that has been done around Ballarat by the Water Commission and by the City Council, the result being that bare lands have been turned into profitable forests. In 1921 there were 200,000 trees growing of marketable value ; since that time various species of conifers have been added, in many cases by the thousand. Since 1904 over £12,000 has been received from the sale of timber. The results of these plantings prove that the Ballarat district is well adapted for pine plantations, and as these, it has been shown, can be established on old worn-out mining areas, there is no sacrifice of good land suitable for other cultivation.

"The Australian Museum Magazine."—The two numbers for the current year of this magazine are well up to the standard of those of the first volume. The magazine is one in which almost any nature-lover will find something of interest, while the articles are generally well illustrated. The issue for April contains an article by Mr. Chas. Barrett, C.M.Z.S., entitled "Wild Life of the Mallee," with a number of figures of Mallee life. Another article, by Mr. A. Musgrave, F.E.S., entomologist to the Australian Museum, Sydney, entitled "Some Australian Insects Injurious to Man," deals with quite a number of insects whose attacks are more or less unpleasant, but none of them of a serious character.

NOTES ON THE COLEOPTERA OF NORTH-WESTERN VICTORIA.

PART XI.

BY J. C. GOUDIE.

(*Read before the Field Naturalists' Club of Victoria, 12th May, 1924.*)

TENEBRIONIDÆ.

THIS family, well represented in Australia, belongs to the comprehensive group of the Heteromera, in which all the species have the front and middle tarsi 5-jointed, and the hind tarsi 4-jointed. This, with the moniliform antennæ, serves easily to distinguish them from the Carabidæ, which many of the species otherwise resemble considerably. They are varied in habits, some large groups of species being exclusively ground-dwellers, these being mostly night-feeders, taking shelter by day under logs, &c., whilst others, such as Chaltopterus, frequent trees and shrubs. I am indebted to Mr. H. J. Carter, F.E.S., for the names of many species, for revising my list, and for the following note on the same:—"The first noticeable point that occurs in an examination of the list is the poverty of the region in the group, both in genera and species, as compared with Eastern Australia or the coastal districts of the west. The following figures indicate the remarkable difference of numbers. Of the 110 genera and 1,053 species of Australian Tenebrionidæ, the collection made by Mr. Goudie—probably nearly exhaustive of the region—shows 20 genera and only 47 species. This indicates an arid climate and scantiness of wooded regions—at least, of the larger timber and denser vegetation of eastern areas—a fact which is further shown by an analysis of the genera. No less than 21 of the 47 species belong to the allied groups Helæinæ and Nyctozoilinæ, which are specially characteristic of the central and western fauna. Of these, only three—*Onosterrhus acuticollis*, Cart., *O. goudici*, Cart., and *Æthalides marginicollis*, Cart. (so far as I know)—are peculiar to the district, the rest being also found in Western New South Wales, South-Western Queensland, or (as with the majority of Mallee insects) in South Australia. Other typical dry-country genera represented are Exangeltus, Mesomorphus, and Gonocephalum (one species of each), and Cestrinus (three species). Of the Adeliinæ, so numerous in Eastern Australia, only five species are found. Cardiothorax is unrepresented, or merely suggested by its ally, *Otrintus behri*, Germ., found from Western New South Wales to Eucla (S.A.) Adelium is represented by three species (out of a total of 61 for Australia), of which *A. goudici*, Cart., seems to be peculiar to the region, while a single Scirotrana completes the tally of this sub-family,

Of the probable Torresian or Austro-Malaysian representatives. *Anansis metallescens*, Westw., and seven or eight species of Chalcopterus (of the 110 Australian species), have been taken by Mr. Goudie, none, however, peculiar to the district. While the Tenebrionidæ are apparently more able to resist arid conditions than the moisture-loving Carabidæ, they yet depend largely on vegetation in which they breed,, and this, again, is dependent on rainfall. A comparative list of Tenebrionidæ for each region would thus be a fairly accurate measure of its rainfall."

This is a rather formidable, but true, indictment of the Mallee as a producer of Tenebrionids. As a kind of set-off, however, it might be suggested that if the greater part of the vast Eyrean sub-region were included in the comparison, the result would not be greatly altered. It may be also pointed out that, although the number of genera and species is small, yet the individual numbers of some genera, such as Saragus, Chalcopterus, Cestrinus, Adelium, and Seirotrana, are great—in fact, they are the most common of Mallee beetles. It would be interesting to know how many genera and species of this family are to be found in the heavily-timbered areas of Gippsland, to test the theory as to their numbers being an index of rainfall.

Exangeltus gracilior, Blackb.

A rather narrow, brownish or piceus beetle, under half an inch long ; the elytra are closely and strongly punctate. Found under the bark of trees, and has a wide range over the central area of the continent.

3662. *Mesomorphus villiger*, Blanch.
Gonocephalum elderi, Blackb.
3664. *Cestrinus punctatissimus*, Pasc. = *aversus*, Pasc.
3671. *C. trivialis*, Er.
C. brevis, Champ. = *aspersus*, Blackb.

The above five species are small dark brown or blackish beetles, usually found under dead leaves on the ground.

Platydema bicinctum, Champ. (?)
3709. *P. limacella*, Pasc.

P. bicinctum occurs in large numbers about chaff sheds, &c. It is one-twelfth of an inch in length, and is brown, with two yellow fasciæ on the elytra. *P. limacella* is larger, shining black, with a red spot on the shoulder, and another at the tip of each elytron. Specimens have been found in birds' nests.

Tribolium myrmecophilum, Lea, Proc. Roy. Soc. Vict., xvii. (n.s.), part 2, p. 383.

" Distinguished from the cosmopolitan *T. confusum* and

ferrugineum by the small terminal joint of the antennæ and other features." It occurs rather plentifully in the nest of the wood ant, *Iridomyrmex nitidus*.

3742. *Pterohelæus bullatus*, Pasc.
P. dispersus, Macl. = *fraternus*, Blackb.
P. granuliger, Macl.
P. nitidissimus, Pasc.
P. planus, Blackb.

These species of Pterohelæus are blackish or piceus, the largest being *P. granuliger*, three-quarters of an inch long. The outer margins of prothorax and elytra are produced and flattened. They are slow-moving beetles, usually met with under logs or under the bark of trees.

3768. *Helæus castor*, Pasc.
3780. *H. moniliferus*, Pasc.
3784. *H. princeps*, Hope.
3787. *H. squamosus*, Pasc.

These are broad, flat beetles, having the explanate rim greatly developed, overlapping in front so as to encircle the head. The elytra are carinate or ridged. *P. princeps* is black, about 1¼ inches in length. All the species are found in the most arid situations, under logs, &c.

Saragus catenulatus, Macl.
S. lævis, Macl.
S. latus, Blackb.
S. frenchi, Cart.

The species of Saragus are short, roundly ovate, generally black, with costate elytra, except *S. lævis*, which is smooth. Habits similar to Helæus. *S. frenchi*, slightly over a quarter of an inch long, is the smallest of the Mallee species.

Onosterrhus acuticollis, Cart., Ann. Queens. Mus., Nov., 1911.
O. goudiei, Cart., *loc. cit.*
O. (*Hypocilibe*) *rotundatus*, Blackb.
3834. *O. vage-punctatus*, Haag. Rut.

The four species of Onosterrhus are decidedly rare. They are smooth, strongly convex, bluish-black beetles, the largest, *O. rotundatus*, being seven-eighths of an inch long. They occur on the ground, sheltering under fallen boughs.

Æthalides marginicollis, Cart., Proc. Linn. Soc. N.S.W., xxxiv., part 1, p. 136.
Æ. punctipennis, Bates, Ent. Mo. Mag., x., 1873, p. 50.

These are stout, convex, and black, with costate and wrinkled elytra. *Æ. marginicollis* measures 17 x 9 mm.; *punctipennis* is smaller. Both are rare insects, found under logs.

3839. *Amphianax subcoriaceus*, F. Bates — *Agasthenes goudiei*, Cart.

This is a black, somewhat shining, rather flattened species, from half to three-quarters of an inch in length. Both basal and apical angles of prothorax are shortly but acutely produced. Mr. Carter, in a letter to me, has authorized the above synonymy.

3849. *Agasthenes westwoodi*, F. Bates.

A slightly larger beetle than the preceding, but similar in shape, colour, and habits, being taken on the ground under logs. I have seen only two specimens. It occurs also in Western Australia.

3858. *Hypaulax orcus*, Pasc.

A fairly common species, about three-quarters of an inch long. It is deep black, with rows of strong punctures on the elytra, and with the hind angles of prothorax produced. It is a sluggish insect, feigning death when disturbed. Found under logs, &c.

Tenebrio obscurus, Fab.

An introduced species, occurring in houses and sheds.

3913. *Anansis* (*Prophanes*) *metallescens*, Westw.

A fine and rare beetle. It is an inch in length, the head, legs, and prothorax are black, the front angles of the latter being produced into long, acutely-pointed spines. The upper surface is of iridescent metallic colours, a mixture of green, blue, and purple. Two specimens taken resting on tree-trunks. At Nyah, on the Murray, I took a specimen under a log.

Hymæa laticollis, Cart., Proc. Linn. Soc. N.S.W., 1908, vol. xxxiii., part 2, p. 410.

An elongate, sub-cylindrical, shining fulvous-brown beetle 5 mm. in length. The head is placed vertically. On each elytron are four amber-coloured tubercles, linear-oval in shape, placed as follows: Two on basal half (inner one nearer base), one smaller near apical declivity, the fourth (much larger) on the shoulder. A rare species, only two examples being known. They were found under the bark on a log at Sea Lake in April. The type is in the National Museum.

4007. *Otrintus behri*, Germ.

This is a long, narrow, carab-like species, met with under stones and logs. It is black, about three-quarters of an inch long, the elytra striate. The femora are considerably thickened.

4011. *Adelium angulicolle*, Cast.

A. goudiei, Cart., Proc. Linn. Soc. N.S.W., xxxiv., part 1 p. 150.

4047. *A. similatum*, Germ.

These also have a superficial resemblance to the Carabidæ. They are of a bronzy-green colour, and measure about three-

quarters of an inch. Their favourite habitat is under the leaves of fallen boughs.

4037. *Seirotrana parallela*, Germ.

One of the commonest beetles in Victoria. One meets with it almost everywhere. It is narrower than the species of Adelium, is of a black-bronze colour, and about half an inch long.

4146. *Chalcopterus affinis*, Bless. = *howitti*, Pasc.
4148. *C. iridicolor*, Bless.
C. juvenis, Blackb.
4120. *C. picipes*, Macl., var.
4121. *C. polychromus*, Pasc.
4126. *C. resplendens*, Boisd.
C. versicolor, Blackb.
C. vividus, Blackb.

Wherever there are eucalyptus trees there are almost sure to be some of these beetles resting on the trunk or hiding under the bark. Although so common, they are, as many of their specific names indicate, amongst the handsomest of our beetles, being of rich iridescent colours, in which green, blue, and red or purple predominate. They are very convex, with small head and prothorax, and measure from a half to three-quarters of an inch in length. When handled these beetles emit a pungent odour. Over 100 species have been recorded as Australian.

CISTELIDÆ.

This family is close to the Tenebrionidæ. Mr. Carter, who revised the group in 1915,* gives the following differentiating characters :—" (1) Pectinate claws ; (2) anterior coxal cavities closed behind ; (3) the presence of lamellæ on the tarsi." They are active, slender beetles, of small to medium size, frequenting flowers and foliage, and appear in numbers early in the summer.

4169. *Anaxo brevicornis*, Bates.
A. cylindricus, Germ.
A. cylindricus, var. *obscurus*, Blackb.
4198. *Chromomæa fastigiata*, Germ.
4177. *C. unicolor*, Bates.
4206. *Metistete omophloides*, Hope.
4182. *Apellatus lateralis*, Pasc.
Dimorphochilus pascoei, Macl.
4193. *Homotrysis carbonarius*, Germ.
4207. *H. pascoei*, Macl.

MELANDRYIDÆ.

Scraptia lugubris, Lea, Tr. Roy. Soc. S.A., xli., p. 166.

* Proc. Roy. Soc. Vic. 28, N.S., Pt. 1.

ANTHICIDÆ.

These are small beetles found on flowers, occurring at lights or amongst rubbish on the ground. Many of them have transverse markings on the elytra.

4254. *Formicomus mastersi*, King = *kingi*, Macl.
Anthicus ambulans, Lea, Proc. Linn. Soc. N.S.W., xlvii., part 4, p. 482.
4282. *A. floralis*, Linn.
4295. *A. mastersi*, Macl.
4297. *A. myrteus*, King.
A. politulus, Lea.
4306. *A. unifasciatus*, King.

VICTORIAN GEOLOGY.—The Victorian Department of Mines has recently issued several publications dealing with the geology of the State. In Bulletin No. 42, "The Daylesford Goldfield," Mr. H. S. Whitelaw and Mr. W. Baragwanath (the Director of the Geological Survey) gave a comprehensive account of that goldfield, known at its origin, in 1852, as the Jim Crow diggings. This district is known to many persons, containing as it does the celebrated Ajax line of mines, from which many thousands of pounds' worth of gold have been won. The bulletin is well illustrated with maps and plans of the various mines, &c. A contoured plan of Mount Franklin is very interesting, as it is one of the best preserved craters in the State. The greater part of the rim is over 100 feet above the floor, while a small portion is 280 feet. An illustration is given of the scene in the basin, looking towards the breach, which shows a well-wooded floor. Daylesford is also known for its mineral springs, of which there are a dozen or so in different directions. The best known is the Hepburn Spring, whose life seems to depend upon whether workings on the Frenchman's line of reef happen to be in progress or not. For the sake of the attraction to the district, this mine, unless very rich, should be kept closed. Bulletin No. 46 is devoted to a report on the Phosphate Deposits in the Mansfield District. This is by Mr. A. M. Howitt, with palæontological appendices by Messrs. F. Chapman, A.L.S., T. S. Hall, D.Sc., and R. A. Keble. This is also well illustrated. The deposit of phosphate rock has been known since 1904, and is now being mined for commercial purposes by the Heathcote Chemical Co. Four miles south is another deposit known as the Howe's Creek beds. Mr. Chapman's report records quite a number of genera and species, some of which are new to science, belonging to Upper Cambrian times, though determined in 1918, the report has only now been made available to the public.

PLATE I.

A NEW SPECIES OF BRACHYCOME.

By P. F. MORRIS, National Herbarium, Melbourne.

(WITH PLATE.)

(*Read before the Field Naturalists' Club of Victoria, 12th May, 1924:*)

BRACHYCOME ALPINA, P. F. Morris, sp. n.

Herba perenne, scabrida, rhizomate, 5–10 cm. alta; foliis omnibus (v. plerisque) radicalibus, obovato-spathulatis, obtusis, grosse crenatis in petiolum angustatis, 1–2.5 x 0.5–1 cm.; scapis solitariis erectis, 5–10 cm. altiis; capitulis parvis 1 cm. latis; radii flores ligulis conspicuis pallide lilacini, disci flavi. Involucri squamis obovatis lanceolatis 5 mm. x 2 mm. Acheniis nigris, non compressis, marginatis, obovatis-lanceolatis, 2 mm. longis; pappo brevissimo.

A small perennial plant 5–10 cm. high, scabridous, root-stock rhizomatic, branched, having the withered remains of the old leaves at the apex. Leaves (radical) 1–2.5 cm. in length, 0.5–1 cm. across, obovate-spathulate, toothed towards the apex, crenate or more or less entire, and narrowed into a broad petiole. Scape not branched, erect, 5–10 cm. high, bearing a single capitulum and 4–6 distant leaves, much shorter and narrower than the basal ones. Capitulum 1 cm. broad at base and 3.5 cm. across the tips of the ray florets; involucral bracts 5 mm. long, 2 mm. broad, bluntly pointed. Ray floret pale lilac or light blue, narrow, about 6–8 mm. long, ligulate. Disc floret yellow, slightly more than twice the length of achene. Achene 2 mm. long, obovate-lanceolate, not compressed, and having a thickened margin; the achene turns black at maturity. Pappus minute, or none.

Pretty Valley, Bogong Plateau, Victoria. Collected by H. B. Williamson. Placed in Bentham's Section II., Paquerina ("achenes never winged, pappus minute or none"). Placed next to *B. trachycarpa*, F. v. M.

Superficially the plant resembles a small form of *B. scapiformis*, D. C. (Sec. III., Brachycome), which has winged achenes narrow and acute involucral bracts, and is a much larger plant.

EXPLANATION OF PLATE.

Drawing natural size. *a*. Achene; *b*. Involucral bracts; *c*. Disc floret showing stigma and achene (variously enlarged).

"THE TRANS-AUSTRALIAN WONDERLAND."—Every naturalist at least who has made the overland journey between Perth and Melbourne, or *vice-versa*, will be interested in this booklet of nearly one hundred pages, describing, with the aid of illustrations, some of the features of the Ooldea district. Its

author, Mr. A. G. Bolam, station-master at Ooldea, has spent his spare moments profitably in jotting down what he has learned by his own observations, and what he has learned from the aboriginal inhabitants of the district about the beasts, birds, reptiles, plants, &c., of his neighbourhood. Fishes cannot be included for the simple reason that Ooldea is hundreds of miles from any stream. Ooldea is about 425 miles west of Port Augusta, and it is situated just on the eastern edge of the wonderful Nullabor Plain, which stretches westerly for 450 miles—an almost dead level, treeless tract, covered by such dwarf salt-bushes and other vegetation which can exist on an annual rainfall of about eight inches. Ooldea is fortunate in being situated near a "soak," where underground water can always be obtained, and this has made it an important station on the line, and also a great meeting-place for the natives for hundreds of miles in either direction. Among the animals dealt with are the Marsupial Mole, Kangaroo Mouse, House-building Rat, Fat-tailed Mouse, Bandicoots, &c. The first-named animal is a little creature of about six inches in length; it is without eyes or ears, but possesses legs and feet, with which it is enabled to disappear into the sandy soil in a twinkling. The House-building Rats construct a home for themselves of fine sticks, sometimes as large as six feet in diameter and three feet in height—a seemingly wonderful performance for such small creatures; underneath is a tunnel home. Some remarkable lizards are to be met with among the sand-hills, such as the Mountain Devil (Moloch), a formidable-looking creature, but perfectly harmless, living on ants, flies, &c., and, becoming quite tame, are useful creatures about the house. The Frog or Barking Lizard is an extraordinary-looking animal, but quite harmless. The birds include the Wedge-tailed Eagle, Wild Turkey, Mallee-fowl, Cave Owl, &c. The latter bird lives in the caves and blow-holes of the Nullabor Plain. Quite a number of species of smaller birds are seen from time to time, while Cockatoos and Parrots often appear in large numbers, so that Ooldea cannot be considered quite devoid of interesting specimens of natural history. The vegetation is naturally of a kind that can withstand heat and droughts. Acacias, Myoporums, Cassias, Quandongs, are a few of the genera represented. In the *Naturalist* for March, 1920 (vol. xxxviii., p. 128), Mr. J. A. Kershaw gave a list of about forty species, mostly trees and shrubs, collected in the neighbourhood just as samples of the vegetation; some of these are to be found in Victoria, such as *Godenia pinnatifida* and *Pittosporum phillyroides*. The little volume concludes with an interesting description of the aboriginals of the district, both in their primitive state and since their contact with white men.

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— OF —

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The Author of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS – ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 14th JULY, 1924.

1. Correspondence and Reports.
2. Election of Members.

AS ORDINARY MEMBER—	PROPOSER.	SECONDER.
Mrs. Ebbs, Fernhurst-grove, Kew.	Miss A. Fuller.	Mr. F. G. A. Barnard.
Mrs. V. Miller, 5 Lambeth-place, St. Kilda.	Mr. W. Glance.	Mr. C. Daley, F.L.S.
Mr. Thos J. James, 110 Malin g-road, Canterbury.	Mr. J. Stickland.	Mr. F. Pitcher.
Mr. W. Mohr, 9 Marine-parade, St. Kilda.	Mr. J. A. Kershaw.	Mr. C. Oke.
Mr. J. Malcolm Sinclair, 700 Burwood-road, Auburn.	Mr. J. Stickland.	Mr. F. Pitcher.
Miss Clara Quarterman, 4 Canterbury-road, Toorak.	Mr. C. Oke.	Mr. H. B. Williamson, F.L.S.
AS COUNTRY MEMBER—		
Miss Jessie Curdie, c/o Mrs. A. J. Black, Mount Noorat, Terang.	Mr. C. Oke.	Mr. H. B. Williamson, F.L.S.

3. Nominations for Membership.
4. General Business.
5. Remarks by Exhibitors relative to their Specimens.

   Ten minutes' adjournment for discussion of Exhibits.

6. Reading of Paper and Discussion thereon.

   1. By Mr. F. Pitcher—"In the Strathbogie Ranges."
   2. By Mr. J. Stickland.—"The Infusoria of the Melbourne District. Part 2."

   The committee will be pleased to receive promises of papers for future meetings.

7. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

   Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and *Naturalist*. Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Club year ended on 30th April last. Any subscriptions overdue should be forwarded to the Hon. Treasurer *at once*.

Subscriptions for the year 1924-5 became due on 1st May.

SPECIAL NOTICE.—The attention of members is directed to item 8 of business paper. Notices of exhibits should, if possible, be type-written.

The Victorian Naturalist.

Vol. XLI—No. 3. JULY 10, 1924. No. 487.

FIELD NATURALISTS' CLUB OF VICTORIA.

The forty-fourth annual meeting of the Club was held at the Royal Society's Hall on Monday evening, 16th June, 1924.

The president, Mr. C. Daley, B.A., F.L.S., occupied the chair, and about seventy members and visitors were present.

CORRESPONDENCE.

From Miss A. Fuller, thanking the Club for the letter of sympathy forwarded to her on the sudden death of her brother.

From the local secretary of the A.A.A.S., reminding members of the meeting of the Association, which will be held in Adelaide during August next. The Club delegates to the meeting are Mr. F. Chapman, A.L.S., Mr. C. Daley, B.A., F.L.S., and Dr. C. S. Sutton.

REPORTS.

A report of the excursion to the Clifton Hill Quarry, on Saturday, 24th May, was given by the leader, Mr. A. L. Scott, who said that a fair number of members had taken part in the excursion, and had been greatly interested in the quarry, which is of immense size, and is now nearly worked out. The basalt here is celebrated for the many beautiful minerals which it contains, but on this occasion did not yield any very unique specimens.

A report of the excursion to the Entomological department of the National Museum on Saturday, 7th June, was given by Mr. C. A. Lambert, who said that the party was met by Mr. G. F. Hill, entomologist to the Museum, who exhibited a number of drawers of insects from various parts of the world, and kept the members thoroughly interested for several hours with the remarks he made about them.

A report of the excursion to Ferntree Gully on Monday, 9th June (King's Birthday), was given by the leader, Mr. C. Oke, who said that a small party of members had spent the day in the vicinity of Sherbrooke, and collected a large number of natural history objects of all kinds, of which further mention would be made later.

ELECTION OF MEMBER.

On a ballot being taken, Mr. W. B. Cottman, 54 Point Nepean-road, Elsternwick, was duly elected a member of the Club.

GENERAL BUSINESS.

Mr. F. G. A. Barnard referred to the death of Mr. J. B. Walker, the result of a street accident. Mr. Walker had been a member of the Club for some thirty years, and was the senior partner of Walker, May and Co., the printers of the *Naturalist* for about thirty-five years. He moved that a letter of sympathy be sent to Mr. Walker, jun. The chairman said that one of the associate members of the Club, Mr. S. J. Walker (not related to the late Mr. J. B. Walker) had also passed away since last meeting, and moved that a letter of sympathy be sent to his relatives. The motions were carried in silence, all standing.

ANNUAL REPORT.

The hon. secretary, Mr. C. Oke, read the forty-fourth annual report, for the year 1923–4, which was as follows:—

"To the Members of the Field Naturalists' Club of Victoria.

"Ladies and Gentlemen,—In presenting the forty-fourth annual report of the Club for the year ended 30th April, 1924, your committee congratulates members on the continued success of the Club, and desires to thank them for the support received during the past twelve months.

"Commencing the year with 303 members and associates on the roll, there were elected 27 ordinary and 5 country members. Two deaths occurred, and resignations numbered 14, leaving a membership of 319—an increase of 16 for the year. It is with deep regret we have to record the deaths of two well-known members—Mr. J. Cronin, Director of the Botanic Gardens, who passed away in June. Although not an active member of the Club, Mr. Cronin was always very sympathetic towards the Wild-flower Exhibitions, and sent good displays of cultivated native flowers from the Gardens. Mr. W. H. D. Le Souëf, Director of the Melbourne Zoological Gardens, after a long illness, passed away in September. In the earlier days of the Club he was a prominent office-bearer and worker, but in later years became more attached to the Ornithologists' Union. An account of his activities appeared in the October (1923) *Naturalist*.

"The monthly meetings have been held regularly, with an average attendance of 60–70 members and friends. Ten papers have been read and four lectures delivered, and these, together with the discussions that have followed, have proved very interesting, and have shown that the work of the Club, both on the scientific and popular sides, has been maintained at its usual high standard. The following lectures and papers have

been delivered:—In May—'Thrips: An Unpopular Insect Treated Popularly,' by Mr. R. Kelly, and 'On a Thalassoid Element in the Australian Molluscan Fauna,' by Mr. C. Hedley; in June—'Botanical Notes about Bairnsdale, and the Eastern Lakes,' by Mr. T. S. Hart, M.A., B.Sc.; in July—'Effects of the Ice Age on Tasmanian Topography,' by Mr. A. N. Lewis; in August—'The Vegetation of the Cradle Mountain, Tasmania,' by Dr. C. S. Sutton; in September—'The Fossiliferous Beds of Violet Creek, near Hamilton, Victoria,' by Mr. F. Chapman, A.L.S.; and 'Notes on Spiders,' by Mr. S. Butler; in October—'The Flora of the Whipstick Scrub,' by Mr. D. Paton; in November—'Four Weeks' Collecting on Richmond River and Queensland,' by Messrs. A. N. Burns and L. Thorn; and 'Coleoptera of North-Western Victoria, Part IX.,' by Mr. J. Goudie; in December—'The Microscope, and What It Reveals,' by Mr. J. Searle; in January—'Notes on Victorian Orchids, No. II.,' by Mr. E. E. Pescott, F.L.S., and 'Views of a Trip Through Gippsland, and Around the Mildura District,' by Mr. H. B. Williamson, F.L.S.; in February—'Some Glimpses of Our Bush Birds,' by Mr. F. E. Wilson, and 'Description of a New Genus of the Family Epacridaceæ,' by Mr. H. B. Williamson, F.L.S.; in March—'Notes from Natya,' by Mr. C. Oke. The April meeting was devoted to a display of microscopes and microscopic objects. Some of the papers were illustrated with lantern slides, and nearly all the papers have appeared in the Club's journal.

"The excursions are as popular as ever, and have generally been well attended. A number of Saturday afternoon trips have been made to places around the metropolis, while whole-day excursions to places further afield have been made, such as to Frankston, Mooroodue, Yarra Junction, Healesville, Beaconsfield, Brisbane Ranges, Belgrave, and Sherbrooke, and more extended visits have been made to Bendigo, National Park, and Warburton.

"The annual exhibition of wild-flowers was held in the Melbourne Town Hall on Tuesday, 3rd October, and was opened by the Premier, the Hon. H. S. W. Lawson. Flowers were not so plentiful this year, with the result that the tables were not quite so full as on some previous occasions, but on the whole it was a very creditable display, and resulted in a net profit of £107. Of this, £53 was donated to the Victorian Bush Nursing Association. In returning thanks for the donation, the Bush Nursing Association asked the Club to nominate two of its members as life governors, and the committee recommended the president, Mr. C. Daley, B.A., F.L.S., and the hon. editor, Mr. F. G. A. Barnard, for the positions.

"The Plant Names Committee completed its task of revising the lists of vernacular names early in the year, and the 'Census of Victorian Plants' was published in time for the October wild-flower exhibition, where there was a fair demand for the volume. It was decided by the Club that presentation copies of the book be issued to those gentlemen who had given so much time and thought to the compilation of this work, and leather-bound copies were presented at the December meeting to the following:—Prof. A. J. Ewart, Dr. C. S. Sutton, Messrs. J. W. Audas, F.L.S., W. R. A. Baker, F. G. A. Barnard, C. Daley, B.A., F.L.S., A. D. Hardy, P. F. Morris, F. Pitcher, E. E. Pescott, F.L.S., P. R. H. St. John, and H. B. Williamson, F.L.S., to all of whom the Club is much indebted for their labour.

"The Plant Names Committee has given place to the Plant Records Committee, consisting of four members—namely, Dr. Sutton, Messrs. F. P. Morris, P. R. H. St. John, and H. B. Williamson, F.L.S., whose duty it will be to inquire into new records of plants and alterations in nomenclature, and recommend the publication of the same from time to time in the *Naturalist*.

"It is always gratifying to see members' names among the new graduates at the University, and this year the following have graduated:—Miss R. E. Chisholm, as Bachelor of Arts; Mr. C. Gillies, as Bachelor of Surgery; and Mr. P. C. Morrison, as Bachelor of Science, to all of whom we offer the Club's congratulations.

"The fortieth volume of the *Victorian Naturalist* has been completed, and once again the Club is greatly indebted to the hon. editor, Mr. F. G. A. Barnard, for his untiring effort in producing an interesting and useful journal. Unfortunately it could not be maintained at the intended size of twenty-four pages.

"Your committee has had under grave consideration the increased cost of the *Naturalist*,* and under existing conditions finds that it has, apparently, to decide between reducing the size of the journal or finding a cheaper printer, and an early decision will have to be made, as the position is serious.

"The hon. treasurer reports the receipts for the year amounted to £182, and the expenditure to £344—a debit of £162 for the year, exclusive of the cost of printing the 'Census.'

"Your committee has given its co-operation to all measures for the preservation of various localities as sanctuaries for our native flora and fauna.

* In comparing the cost of the *Naturalist* for 1922-3, £155, and 1923-4, £249, allowance must be made for the increase in the number of pages and plates, 70 and 14 respectively; in addition to which a larger number of copies were printed.—[Ed. *Vict. Nat.*]

"The attendance at the twelve committee meetings has been as follows:—Messrs. Oke, 12; Sutton, 12; Williamson, 12; Daley, 11; Searle, 11; Thorn, 11; Barnard, 9; Chapman, 7; Hooke, 7; Hughes, 6 (resigned after 7 months); Wilson, 6; Kershaw, 3; and Pescott, 3.

"In conclusion, your committee desires to express its gratification at the way its efforts to maintain the work of the Club, and to further its aims, have been supported by the members, and trusts the same support will be given to the incoming committee.

"On behalf of the committee,

"(Signed) CHAS. DALEY, *President.*
C. OKE, *Hon. Secretary.*

"Melbourne, 21st May, 1924."

The report was received, and adopted, on the motion of Messrs. G. Coghill and J. H. Harvey, A.R.I.V.A.

FINANCIAL STATEMENT.

The hon. treasurer (Mr. A. G. Hooke) read the financial statement for 1923–4, which was as follows:—

RECEIPTS.

To Balance, 30th April, 1923				£70	0 10
,, Subscriptions—					
Ordinary Members	£124 17 6				
Country Members	27 5 0				
Associate Members	1 7 6				
	£153 10 0*				
Victorian Naturalist—					
Subscriptions	4 4 6				
Sales	2 7 9				
	6 12 3				
,, Badges, Sales of	0 18 0				
,, Donations—					
Publishing Fund	5 13 0				
,, Interest—Savings Bank and War Loan	15 17 7				
				182	10 10
,, Sales of "Census of Victorian Plants"				34	7 0
,, Wild-flower Exhibition—					
Admissions	95 1 0				
Sales of Flowers and Plants	48 16 5				
Refreshments (profit)	17 0 1				
				160	17 6
,, Savings Bank Deposit withdrawn—					
Plant Names A/c.	150 0 0				
General A/c.	75 0 0				
				275	0 0
				£672	16 2

* Arrears, £14 15s. 0d.; 1923–4, £127 12s. 6d.; advance, £11 2s. 6d.—total, £153 10s.

EXPENDITURE.

By *Victorian Naturalist*—								
Printing	£206	11	3					
Illustrating	42	9	5					
Free Reprints	13	17	8					
Reprints Charged	6	15	10					
				£269	14	2		
,, *Victorian Naturalist*—								
Wrapping and Posting				22	2	2		
,, Rooms—Rent and Attendance				13	10	0		
,, Library—								
Books and Periodicals ..	£2	5	0					
Insurance	0	7	0					
				2	12	0		
,, Lantern—Expenses				0	14	6		
,, Printing				23	4	0		
,, Postages, &c.				7	18	0		
,, Crockery for Wild-flower Exhibition				4	17	5		
							£344	12 3
,, Wild-flower Exhibition—								
Town Hall and Attendance .. .. .. (Rent, £18, paid in previous year)				11	5	0		
Printing and Advertising				7	4	0		
Cartage, &c.				9	4	7		
Flowers and Plants				8	1	3		
Donation—Bush Nursing Association ..				53	0	0		
							88	14 10
,, Census of Victorian Plants—Printing and Binding ..							215	12 6
,, Melbourne Town Hall—Deposit Wild-flower Exhibition, 1924							18	0 0
							666	19 7
,, Balance in E. S. & A. Bank							5	16 7
							£672	16 2

A. G. HOOKE, *Hon. Treasurer.*

30*th May*, 1924.

Audited and found correct.

ALFRED J. TADGELL, }
FREDERICK PITCHER, } *Auditors.*

13*th June*, 1924.

The following statement of assets and liabilities was also read :—

ASSETS.

Balance in E. S. and A. Bank				£5	16	7	
War Loan Bond				20	0	0	
Arrears of Subscriptions (£40), say				20	0	0	
Deposit in Savings Bank				100	0	0	
"Census of Victorian Plants," Stock on hand at cost price				181	5	6	
Library and Furniture at Insurance Value ..				130	0	0	
Rent of Town Hall—paid in advance				18	0	0	
Sundry Accounts due—							
Advertisements in *Naturalist* ..	£3	15	0				
Reprints	6	15	10				
				10	10	10	
				£485	12	11	

LIABILITIES.

Subscriptions paid in advance	£11 2 6
Char-a-banc Fund	6 13 0
Outstanding Accounts	*Nil*
	£17 15 6

On the motion of Messrs. G. Coghill and F. Pitcher, the statements were read and adopted. The latter remarked on the accuracy and detail in the accounts as presented by the hon. treasurer.

ELECTION OF OFFICE-BEARERS.

The chairman said that Mr. E. E. Pescott, F.L.S., had withdrawn his nomination for the office of president, owing to the fact that he considered Mr. Searle's long membership of the Club and the great assistance he had been to many members in pursuit of their hobbies entitled him to the position, and that he would not be a candidate for the office of vice-president, for which he was eligible, in accordance with the rules of the Club. The following office-bearers, being the requisite number required, were then declared elected:—President, Mr. J. Searle; vice-presidents, Messrs. G. Coghill and F. E. Wilson, F.E.S.; hon. treasurer, Mr. A. G. Hooke; hon. librarian, Dr. C. S. Sutton; hon. editor, Mr. F. G. A. Barrard; hon. secretary, Mr. C. Oke; hon. assistant secretary and librarian, Mr. H. B. Williamson, F.L.S. Mr. F. Pitcher said that he desired to withdraw his name from the nominations for the committee owing to pressure of other engagements. The remaining nominees, Messrs. F. Cudmore, J. A. Kershaw, A. E. Rodda, and L. Thorn were declared elected, and on a nomination being requested for fifth place, Mr. J. Stickland was nominated and duly elected.

A vote of thanks to the retiring committee was moved by Mr. J. Stickland, and carried unanimously.

PRESIDENT'S ADDRESS.

The retiring president, Mr. C. Daley, B.A., F.L.S., said that it was customary for the retiring president to give an address on the work of the Club or on some special subject. He proposed to say a few words about Australian gem stones.

In the course of his remarks the president said that gems had played an important part in history and superstition from time immemorial. They had even been the cause of wars. Tradition and romance were inseparable from certain famous stones, and even to-day amongst some races magical powers are attached to certain kinds of stones. Australia has produced almost every kind of gem, though in many cases either not of sufficient size, or in insufficient quantity, to really establish

the search for any particular kind as a profitable industry. The most valuable of all gem stones, the diamond, had been found in all the States, but nowhere approaching the production of the Rand, in South Africa. New South Wales had the distinction of producing the largest diamond, found near Oberon in 1905, and weighing 28⅝ carats. Supphires have been found in considerable quantities, especially in Queensland, but mostly the green and yellow types. Rubies occur at several places in Queensland and New South Wales, but are generally too small to command high prices, though their colour is good. Quartz crystals were prized to some extent by the Australian aboriginals, and specimens are often found associated with the *débris* of their kitchen middens. A gem of the silica group is the opal, and Queensland has produced some of the finest specimens known to the world: a variety known as "black opal" is dictinctly Australian, and commands a high price, one weighing 6½ carats was sold for £102. A remarkably fine opal known as the "Flame-tree Opal," weighing 253 carats, was found in Queensland some years ago. It is almost chameleon-like in its changing hues. When examined it was found to have in its structure fossil remains of the ginko tree of the Jurassic period. The topaz and beryl have been found near Stanthorpe, in Queensland, and in other places. Garnets have been found in considerable quantities north of Oodnadatta, in South Australia, also at Harcourt, Maldon, and Omeo, in Victoria. A large number of other gem stones were mentioned, and their chemical composition given. From the indications already given it may safely be concluded that many valuable discoveries await the seeker after Australian gem stones.

PAPER READ.

By Mr. A. J. Tadgell, entitled "Mount Bogong and Its Flora."

The author gave an interesting account of his last visit to Mount Bogong, Victoria's highest mountain (6,508 feet), in January last, in company with Mr. A. G. Hooke, the hon. treasurer of the Club, and a friend. Owing to its distant position, considerable time is occupied in reaching it from Melbourne and making the ascent. Remarking on the flora, which is decidedly alpine in its character, the author said that his collections, as the result of several trips, amounted to 256 species. He had also collected some fifteen mosses, all at more than 5,500 feet. He concluded with a list of the species collected, with notes of the height at which they were found.

REMARKS ON EXHIBITS.

Mr. H. W. Davey, F.E.S., read some notes on two Marbled Geckos (lizards), which he exhibited with young recently born.

Mr. C. French, jun., contributed a note on some parasites collected from a dog by Mr. H. F. Clinton, which had not previously been collected from that host in Australia.

Mr. A. N. Burns, F.E.S., referred to his exhibit of specimens of four species of Prickly Pears (Opuntia) which are proving terrible pests in Queensland and Northern New South Wales, about 29,000,000 acres being infested with this cactus in the former State. He also called attention to two very rare Lycaenid butterflies in the case exhibited by Mr. L. Thorn.

EXHIBITS.

By Mr. F. G. A. Barnard. -Flowers of Long-podded Wattle, *Acacia elongata*, grown at Kew.

By Mr. A. N. Burns, F.E.S.—Four species of Opuntia (prickly pear) from Queensland, with photographs of experimental cages used by Prickly Pear Board in Queensland.

By Mr. Geo. Coghill. -Flowers of *Grevillea rosmarinifolia*, from a cultivated plant in his garden at Canterbury.

By Mr. C. Daley, B.A., F.L.S. Case of gem stones in illustration of his address; also, on behalf of Mr. D. Cameron, Mortlake, N.S.W., samples of the following chemicals extracted from the crude oil distilled from *Eucalyptus dives* in the Braidwood district, N.S.W.:—(*a*) piperitone, the crude oil contains 30 to 50 per cent. of it; this is oxidized to (*b*) thymol, or reduced to (*c*) menthol; in the latter case there are two stages —piperitone to (*d*) menthone, menthone to menthol.

By Mr. C. French, jun.—Specimen of a remarkable gall-making coccid (scale insect), *Apiomorpha munita*, from Croydon, Victoria; also the Kangaroo Louse, *Heterodoxus longitarsus*, found on a domestic dog, not previously recorded for Australia from this host; collected by Mr. H. F. Clinton, at North Melbourne.

By Geological Survey of Victoria, per Mr. A. E. Rodda.—Samples of retinite (fossil resin) from brown coal mines at Lal Lal and Yallourn, also alluvial gold mines at Allendale and Creswick.

By Mr. A. G. Hooke.—Photograph (enlarged) of Mount Bogong, showing the greater part of the top of the mountain.

By Mr. H. E. James. -Flowers of *Eriostemon obovalis* and *Pimelea*, sp., from Retreat-road, Bendigo.

By Mr. C. Oke.—Insects from Menzies Creek, and zircons, &c., from Beechworth.

By Mr. F. Pitcher.—Photographs of webbing and nests of spider, *Arachnina higginsi*, on Douglas Pine, 9 feet high, taken by Mr. C. Hammond in his garden at Belgrave, May, 1924.

By Miss J. Raff, M.Sc., F.E.S.—Leaflet by Dr. Alfred Moore, F.E.S., describing a simple method of mounting insects.

This method is adopted by Prof. Maxwell-Lefroy as the standard for use in the Entomological Department of the Royal College of Science, London. The materials used are celluloid slides and "Thymoplas," a specially prepared plasticine containing a strong preservative. In illustration of above—mounted preparation of a stick insect hatched from egg, and eggs showing the characteristic lid which is pushed off at hatching.

By Mr. W. H. A. Roger.—Three tubes and penholder containing opal chips, from White Cliffs, N.S.W.

By Mr. J. Searle.—Australian precious stones—diamond and topaz from Beechworth, Victoria; sapphire, Queensland; tourmaline, South Australia; zircons, Tasmania; opals, Queensland; turquoise, King River, Victoria; also pearls, Thursday Island and Western Australia.

By Mr. A. L. Scott.—Basalt and basaltic glass (tachylite), under the microscope.

By Mr. A. J. Tadgell.—Geological specimens from Mount Bogong, consisting of metamorphic gneiss (mica schist or phyllite) pegmatite, felspar, quartz with large plates of mica (muscovite), white quartz showing tourmaline crystals.

By Mr. L. Thorn.—Case containing sixty-six species of Australian Lycaenid butterflies, including *Miletus delicia*, var. *duaringae*; and *M. ignita*, var. *chrysonotus*.

By Mr. H. B. Williamson, F.L.S.—Hairball from stomach of a cow.

After the usual conversazione the meeting terminated.

The Kangaroo Louse.—Some interest is attached to the parasites from the domestic dog, exhibited on behalf of Mr. H. F. Clinton, from the fact that they have not previously been recorded from this host in Australia, and were collected by Mr. Clinton, in company with Mr. J. Fraser, from an Irish terrier at North Melbourne, Victoria, on 15th April last, and identified as the Kangaroo Louse, *Heterodoxus longitarsus*, Piaget. Specimens were forwarded to Professor Harrison, Sydney University, who confirmed the determination and the new locality record. Harrison and Johnston (1916) state that they find this species to be generally distributed upon the genus Macropus, and that it has also been recorded from dogs from several localities in America and Africa, as well as from Japan, and from a jackal from Africa. They also state that it is undoubtedly a marsupial parasite, and all occurrences on carnivora must be regarded as stragglers. Mr. W. M. Bale, Kew, Victoria, has in his collection specimens of this parasite, which he obtained from a dog in 1886.—C. French, jun., 16th June, 1924.

NOTES ON THE LIFE-HISTORIES OF SOME VICTORIAN LYCAENID BUTTERFLIES.

By L. B. THORN.

(*Read before the Field Naturalists' Club of Victoria, 12th May, 1924.*)

BEFORE dealing directly with the Lycaenid butterflies, the subject of my paper, it may perhaps be advantageous to some of those present to have a few of the main facts in the life-history of a butterfly put before them.

Butterflies and moths belong to the Order **Lepidoptera** or insects having wings clothed with scales. This order is divided into two sections, the first being called the **Rhopalocera** or club-horned antennae: butterflies belonging to this section. The majority of our butterflies are day-fliers, and like the bright sunshine. A few species in Queensland and northern New South Wales fly in the evening, just before dusk. When at rest the wings of a butterfly are usually held erect above the back, with the upper surfaces pressed closely together. The second section is called the **Heterocera** or insects with broad feathery or fine thread-like antennae. Moths belong to this section, and, as a rule, fly after sunset, and have the above type of antennae. The wings of a resting moth are nearly always seen folded along the back, or flat against the surface on which they rest.

Butterflies and moths are among the giants of the insect world. They can be defined as insects with two pairs of membranous wings well adapted for extended flight, and clothed with scales overlapping each other like the slates on the roof of a house, flattened and rounded on the surface of the wings, but more or less hair-like upon the body. The head is usually provided with a tubular proboscis that can be curled up like a watch spring when at rest, and, when extended, is admirably adapted for sucking up the honey from flowers. Typical butterflies are usually slender-bodied insects with delicate legs and richly-tinted wings; they fly about in bright sunlight, visiting flowers and feasting upon the nectar that they find in the blooms. They have large compound eyes, so that they can see very well; and the slender, tubular mouth is very highly developed in all butterflies.

This evening I am dealing with nine species of our Victorian Lycaenid butterflies, of which I have specimens on exhibition, with, in some cases, complete life-histories. My notes on the species are the result of observations made in the field, and by breeding out some of the species. The localities where the larvae, pupae, and perfect insects have been taken will also be given. All these beautiful butterflies exhibited belong to the family Lycaenidae, which is divided into two sub-families,

Ogyrinae, Theclinae, and four genera—Ogyris, Miletus, Ialmenus, and Protialmenus.

The first stage in the life-history of a butterfly is the ovum, or egg; the second the larva, or caterpillar: the third the pupa or chrysalis; and, lastly, the imago, or perfect butterfly. The eggs of Lycaenid butterflies are smooth, and almost spherical; sometimes smooth and much flattened at base and apex, sometimes densely pitted and flattened. They are deposited either singly or in clusters upon the stems, young shoots, or flower-buds of the food plant. The caterpillar is composed of thirteen segments or rings, the first one being the head. They have sixteen legs, the first six being the true legs, which reappear in the perfect insect, while the other ten are termed pro-legs, or claspers, which are used for holding on to the food plant while the caterpillar is feeding, and are entirely lost when the change into a chrysalis takes place. The Lycaenid larva or caterpillar is almost invariably flattened and slug-like in shape, with the head concealed while at rest. The posterior segments usually possess dorsal glands, which secrete a liquid much prized by ants. The ants, consequently, attend the larvae and shepherd them. Some of these caterpillars feed during the day, others at night, sheltering during the daylight in ants' nests, under loose bark or stones, in curled leaves or flower-buds, or in crevices of the trunk of the food-plant. The chrysalis is usually smooth, and in transverse section ovoid, sometimes much flattened, and with the abdomen extended in lateral ridges. It is usually attached by the tail, and sometimes by a central silken girdle-thread in either horizontal or vertical position, and with the head either upwards or downwards. It is generally found in the same position as the sheltering larvae, more rarely loose just beneath the surface of sandy soil. The perfect butterfly is usually of a small size and delicate structure, with beautiful rich colours of blue, purple, green, and copper. All the legs are developed for walking, but the front pair less so than the others, and are better developed in the female than in the male. These four stages in some of the species exhibited take a year to complete; with other species there are generally two broods in a season—the spring and autumn.

The first three species of butterflies shown belong to the sub-family **Ogyrinae,** genus **Ogyris.** The caterpillars of these three species of butterflies feed on mistletoe, which is nearly always found high up on eucalypts and other trees. Consequently, the butterflies are nearly always seen flying high up over the top of the trees and around the mistletoe, with the result that they are difficult to capture on the wing; hence the best way to secure good specimens is to find the larvae or pupae and breed out the perfect insects.

My first species is the Common Mistletoe Blue, **Ogyris olane,** Hewitson, exhibited with the four stages in its life-history—viz., eggs, inflated caterpillar, chrysalis, and perfect insects of both sexes (see fig. 1). The food plant of this species is the Drooping Mistletoe, *Loranthus pendulus,* which is found on eucalypts. The caterpillars are night feeders, hiding under loose bark on the trees during the day. Sometimes I have found the larvae and pupae, with two species of ants, on the same tree, but they are more often found without ants attending them. When full grown a number of caterpillars crawl down the tree to pupate under bark, which is generally found loose near the base of the trees. It is interesting to note that the pupae, when exposed to a strong light, make a faint clicking sound. I remember the first time I brought home several pupae, and while transferring them into the breeding box, under a strong electric light, to my surprise one after another made this sound, and I found that by placing the pupae in a tin the sound was more clearly defined. There are two broods in a season of this beautiful butterfly. In the spring the caterpillars are found in various stages from June to September. The perfect insects being on the wing during the end of September and throughout October and November. The autumn brood is on the wing in the months of January, February, and March. The majority of the insects emerging from this latter brood in the breeding box were females. Last season I made a note of how long it took this butterfly to emerge from the chrysalis. A full-grown caterpillar was secured on the Moorooduc excursion, 20th October, 1923; the caterpillar turned into a chrysalis on the 27th October, and the perfect female, which is shown, emerged 6th December, thus taking forty days for the butterfly to emerge. The central area on the wings of the male butterfly is dull purple; on the wings of the female bluish-purple. The localities where the larvae and pupae have been secured are Frankston, Eltham, Macedon, Bendigo, and along the Ferntree Gully-road.

The second species is the scarce Mistletoe Blue, **Ogyris abrota,** Westwood, of which I exhibit two stages in the life-history—the pupa and perfect insects of both sexes. The food plant of this species is the common Mistletoe, *Loranthus celastroides,* which is found principally on eucalypts. The caterpillars are night feeders, hiding under loose bark on the trees during the day. They are attended by a number of small black ants of the genus Crematogaster. This ant has a heart-shaped abdomen, and when disturbed raises the abdomen and moves slowly around and about the caterpillar and chrysalis. This butterfly is becoming very scarce in Victoria. It is a rather local butterfly, and generally found in numbers

where it occurs. While on a visit to Broadmeadows with Mr. A. N. Burns, in 1922, we noticed a couple of Meat Ants, *Iridomyrmex detectus*, coming down a tree with two young larvae of this butterfly between their mandibles. After catching the ants we found that both the caterpillars were dead, and very nearly bitten in two. There was one eucalypt tree bearing the Common Mistletoe that was free from this ant and on which I was always sure of finding a caterpillar or chrysalis every season. This year I paid a visit to the tree and found that the Meat Ants had invaded the tree, with the result that my search for a larva or pupa proved fruitless. It seems strange that this large ant kills the larvae of this pretty butterfly, as these same ants attend with great care caterpillars of the Imperial Blue Butterfly, and will always attack you if the larvae or pupae are disturbed. In the spring brood the larvae and pupae are found in the months of July to October; perfect insects are on the wing in the months of October and November. In the autumn brood the butterflies are on the wing in February and March, a large number of female butterflies emerging in this latter brood. The central area on the wings of the male butterfly is rich dark purple; the forewings of the female are brown-black, with the central area light yellow. Localities where larvae and pupae have been collected are Broadmeadows and the You Yangs. W. H. A. Roger secured larvae and pupae at Black Rock and Springvale.

My third species is the Satin Blue, **Ogyris amaryllis meridionalis,** Bethune Baker. The food plant of this species is the Slender Mistletoe, *Loranthus linophyllus*, which is found on Sheoke trees in the north-west of Victoria. F. E. Wilson captured the specimens exhibited in the Mallee during September, 1917. The wings of the male butterfly are metallic blue; of the female, metallic blue tinged with purple.

The next three species belong to the genus Miletus. The butterflies of this genus are noted for their beautiful metallic colours on the upper surface of the wings and also by the rich metallic markings on the under surface of the wings.

The fourth species is the Moonlight Blue, **Miletus delicia delos,** of which I have the four stages the eggs, inflated larvae, pupae, and perfect insects of both sexes (see fig. 2). The central area on the wings of the male butterfly is metallic green, of the female metallic blue. This species is one of our most beautiful butterflies, and is very rarely seen on the wing. This year, for the first time, I found a specimen of this butterfly on the wing. It was walking over the flowers of the Sweet Bursaria, *Bursaria spinosa*, feasting on the nectar with the wings held erect above the back, with the upper surfaces pressed closely

together. The caterpillars of this butterfly are night feeders, hiding under loose bark, also in holes in the tree made by the boring beetles and wood-moth caterpillars. One of the inflated caterpillars shown to-night was found on a Black Wattle, *Acacia mollissima*; the other on a Blackwood, *Acacia melanoxylon*. They are always attended by a number of small black ants of the genus Crematogaster. This ant has a heart-shaped abdomen, and when disturbed raises the abdomen and moves slowly around and about the larvae. The attendance by ants is due to the fact that the larvae secrete a liquid from two glands situated at the posterior end of the body. The ants are also a protection for the caterpillars from parasites, which kill a large number of other species of butterfly caterpillars that are not attended by ants, and also a great number of moth caterpillars, every season. The Moonlight Blue Butterfly larvae are found from the end of January to the middle of November. I have had them feeding for nine months in the breeding-box. From February to April the larvae would come out at dusk from under a piece of blotting paper pinned in the corner of the box and crawl on to their food plant, placed in a bottle of water. From the end of May to July the larvae appear to semi-hibernate or eat very little of their food plant. During August, September, and October the caterpillars seem to be very hungry, and make up for the two months they hibernated—in fact, every week I noticed a difference in the size of the larvae. I used to place small pieces of apple on the food plant. The caterpillars seem to prefer the apple first before going on to the Acacia to feed. I also gave the ants bread soaked in water. If the ants were not in the breeding box to attend the larvae the secreted liquid would form into a mould or mildew, which kills a number of species of Lycaenid larvae every season. This white mildew develops on the eleventh and twelfth segments, situated at the posterior end of the body. Once this mildew forms on the caterpillar it generally keeps in the same position for a week, and gradually shrinks to nearly half its original size, becoming hard and rigid. When full grown the caterpillars attached themselves to the breeding-box with a silken pad at the tip of the abdomen, and also by a central silken girdle-thread. They turned into a brown chrysalis, which gradually became black a week before the butterfly emerged. There is only one brood of this lovely butterfly during the season, the perfect insects being on the wing in the months of December and January. Localities where the larvae and pupae were secured, Dandenong and Woori Yallock. W. H. A. Roger, while collecting at Springvale, found a number of pupae of this butterfly in a roll of loose bark, which was on the ground near the base of a Black Wattle, a number

of ants mentioned being inside the roll of bark with the pupae.

The fifth species is **Miletus ignita,** Leach. The caterpillars of this butterfly feed on the Golden Wattle, *Acacia pycnantha.* H. W. Davey, while collecting ant-nest beetles at Ocean Grove, found a number of caterpillars and pupae of this butterfly. They were attended by a number of small ants, not identified. The caterpillars were found hiding under the roots and curved trunk of the young Golden Wattles, and came out to feed at night. The pupae are found in the same position as the sheltering caterpillars throughout October and November. The butterflies are on the wing in November and December. The central area on the wings of the male butterfly is dull coppery-purple; on the wings of the female, purple tinged blue.

My sixth species, **Miletus hecalius,** Miskin, has been captured on the wing near Sherbrook Falls, Belgrave. A. N. Burns secured a number of pupae at Como, New South Wales, and forwarded four to me, from which three butterflies emerged, a pair of them being exhibited this evening. The central area on the wings of the male is rich purple; on the forewings of the female there is a central patch of orange.

The next two species belong to the genus Ialmenus. Seventh species, the Imperial Blue, **Ialmenus evagoras,** Donovan, showing the four stages in the life-history—eggs, inflated caterpillar, chrysalis, and perfect insects of both sexes. The central area on the wings of this beautiful butterfly is pale metallic blue. This insect is locally common, and generally found in numbers where it occurs. The caterpillars are found in various stages from December to March, feeding during the day on young Early Black Wattles, *Acacia decurrens,* and the Black Wattle, *Acacia mollissima,* and are always attended by a number of small black ants, probably of several species. These ants are always moving quickly, on and about the larvæ. It is amazing to watch how the ants keep with the caterpillars when disturbed. Sometimes there will be a number of larvae grouped together, and if one moves away from the rest the ants are after it. A number will run on to the back of the caterpillar, holding on with their mandibles, while a number move around to head it back, and generally succeed in bringing the caterpillar to a halt after it has moved a few inches. When a caterpillar falls to the ground it is wonderful how quickly the ants on the ground find and keep with it, and when the caterpillar is touched or disturbed, by the way the ants immediately show fight, by running over the hand and nipping it with their mandibles. The majority of caterpillars have pupated by the end of January, and are found attached to small branches, and under surface of leaves of small stunted Acacias. Often

a number of pupae are found clustered together on a silken web spun by the caterpillars. The colour of the chrysalis is brown, which gradually turns a dark brown a week before the butterfly emerges. This season I made a note how long it took the butterfly to emerge from the chrysalis. Twelve full-grown larvae were secured on a small Black Wattle on 3rd February; larvae pupated from the 4th to the 10th of February; perfect insects emerged from the 2nd to the 9th of March, thus taking four weeks for the butterfly to emerge, from the time the caterpillar turned into a chrysalis. Localities where the larvae and pupae were secured, Eltham and Woori Yallock.

The eighth species is **Ialmenus icilius,** Hewitson. G. Lyell has secured larvae and pupae of this rare butterfly at Gisborne, and it also occurs in South and Western Australia. The central area on the wings of the male being metallic green, on the wings of the female metallic blue. The specimen exhibited was captured in Western Australia.

The ninth species is **Protialmenus ictinus,** Hewitson, Imperial Blue, with two stages in the life-history is exhibited, pupae and perfect insects. The caterpillars are found feeding during the day on the Black Wattle, *Acacia decurrens*, and the Blackwood, *Acacia melanoxylon*. They are always attended by the large fierce Meat Ant, *Iridomyrmex detectus*, and I well remember the first time I climbed a tree to secure some full-grown caterpillars. When the larvae were disturbed this large ant immediately attacked me, and it did not take me long to reach the ground and pull off my coat to brush off the ants that were holding on to my arms with their strong mandibles. When a caterpillar falls to the ground it is wonderful how quickly the meat ants moving about near the base of the tree find and shepherd the caterpillar. The larvae and pupae of this butterfly are found in the months of October, November, and December, the perfect insects being on the wing in the end of December and January. Localities where the larvae and pupae were secured, Broadmeadows. A. N. Burns found the larvae and pupae at Bacchus Marsh. J. E. Dixon found larvae and pupae at Kerrisdale, and W. H. A. Roger found the larvae and pupae at Trawool. This species occurs all along the eastern side of Australia and as far north as Kuranda, in Northern Queensland.

My remarks this evening may have created an interest in some of the younger members of the Club who have not yet settled down to any particular line of study. To my mind the development and life of a butterfly is a subject of deep interest. The part different species play in the economy of nature requires patient investigation, and any facts gleaned should be recorded.

The published literature on Victorian butterflies is some-

what scanty. In 1893 E. Anderson and the late F. P. Spry, both members of this Club, published "Victorian Butterflies and How to Collect Them," in which most of our species were illustrated. It is a useful book for a young beginner, but is now out of print, and difficult to obtain. In 1907 W. J. Rainbow, of the Australian Museum, Sydney, published "A Guide to the Study of Australian Butterflies," a more comprehensive work, in which were illustrated a number of life-histories of Australian butterflies. In "Australian Insects," by W. W. Froggatt, Government Entomologist of New South Wales, a number of species are illustrated, also many moths. The standard work at present on Australian butterflies is by Waterhouse and Lyell (also members of this Club), published in 1914. This is a most complete work, describing and illustrating the whole of our Australian butterflies, numbering four hundred and twenty species, also illustrating types of the larvae and pupae of the different families. In this work eighty-four species are recorded for Victoria, classified as follows:—Nymphalidae, 19, of which fourteen belong to the sub-family Satyrinae, "browns" or "forest" butterflies; Lycaenidae, "blues" and "coppers," 29; Pteridae, "whites" and "yellows," 6; Papilionidae, "swallow-tails," 4; and Hesperidae, "skippers," 26. The parts of "Destructive Insects of Victoria," by C. French, first Government Entomologist of Victoria, also contain some account of the life-histories of certain Victorian butterflies, and I am indebted to several of these authors for some of the information included in these notes.

Though not approaching the size and coloration of the more tropical species, Victorian butterflies are not without some beauty, and are well worthy of study.

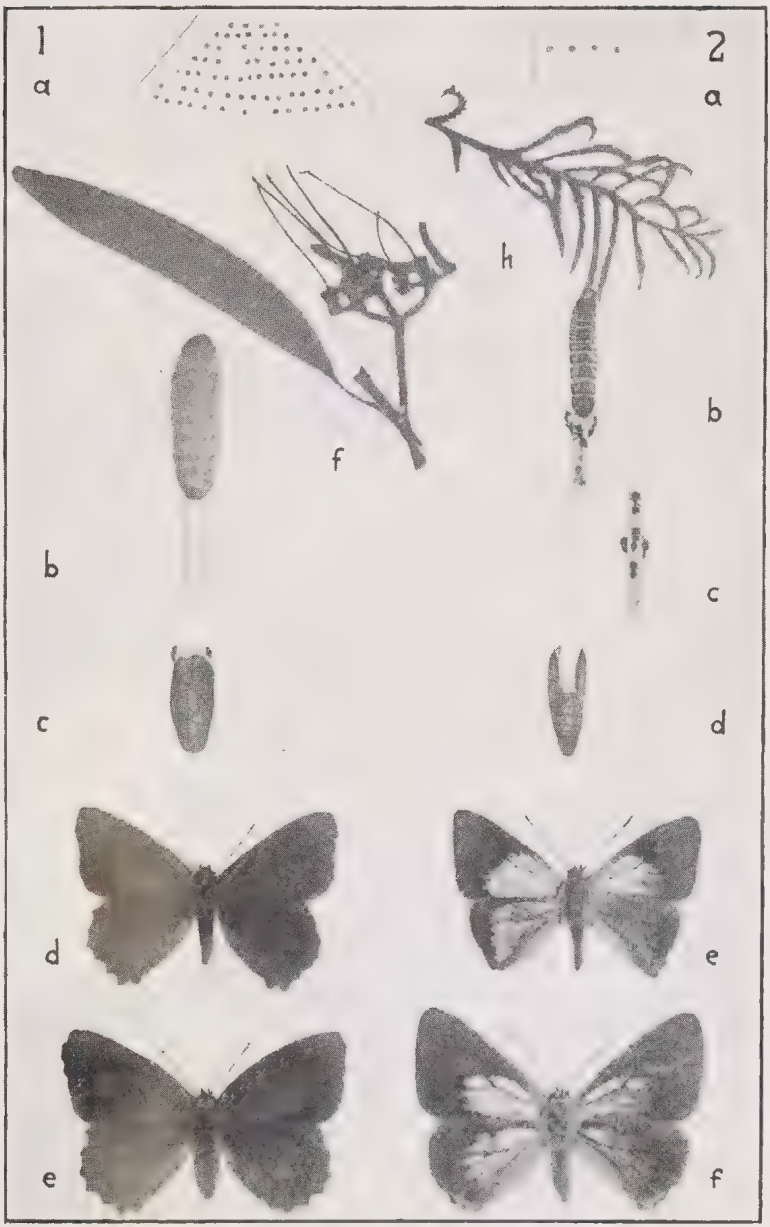
Explanation of Plate.

1.—*Ogyris olane*, Hew., "Mistletoe Blue."—*a*, eggs; *b*, caterpillar; *c*, chrysalis; *d*, imago (male); *e*, imago (female); *f*, food plant (Drooping Mistletoe, *Loranthus pendulus*).

2.—*Miletus delicia delos*, "Moonlight Blue."—*a*, eggs; *b*, caterpillar; *c*, ants which attend caterpillar; *d*, chrysalis; *e*, imago (male); *f*, imago (female); *h*, food plant (Black Wattle, *Acacia mollissima*).

An Appreciation. *Nature* (London) for April 19th, 1924, says that the *Victorian Naturalist* for February, 1924, contains "a very readable account" by Mr. D. J. Paton of "a very unusual plant formation" (the Whipstick Scrub, near Bendigo), and gives brief notes on the characteristics of the vegetation.

PLATE II.



1.—MISTLETOE BLUE BUTTERFLY (*Ogyris olane*), Hew.
2.—MOONLIGHT BLUE BUTTERFLY (*Miletus delicia delos*).

Marbled Geckos Hatched in Captivity.—Early last November Mr. J. E. Dixon, of this Club, returned from a collecting trip to the Mallee around Lake Hattah, North-West Victoria, where he kindly collected for me some living specimens of the Marbled Gecko, *Phyllodactylus marmoratus*, Gray. According to a paper, "The Lizards Indigenous to Victoria," by Lucas and Frost, read before the Royal Society of Victoria, 13th April, 1893, the writers state that this lizard is usually met with under logs and stones. These are certainly not the usual places to look for this species, as, although I have met with great numbers of this gecko, they have always been found under the loose bark of trees, and I have never yet found any under stones, it being essentially an arboreal species. A much rarer species, *Diplodactylus strophurus*, Dum. and Bibr., is usually taken under stones; so also is the Fat-tailed Gecko, *Gymnodactylus miliusii*, Bory., a ground species, which is fairly plentiful under granite slabs on Mount Alexander and similar situations. The several geckos collected at Hattah by Mr. Dixon were received by me on 6th November of last year, and were at once placed in an insect breeding cage having the usual glass front. At night, when the geckos were crawling up this glass, it could easily be seen that two of the females each contained a pair of eggs. The first female deposited her eggs on the night of 14th November, while the other did not deposit her eggs until two days later. I then removed the eggs from the cage and placed them in the small box shown here to-night, together with a small quantity of dry soil for the eggs to rest on, so as to prevent their rolling about. The first egg hatched out on the 7th of this month (June), and two more eggs hatched on the 12th; the other egg was accidentally broken some time before. The young geckos, shortly after emerging from the egg, commenced to shed their skin, this process being completed within twenty-four hours, the markings from which this gecko has received its specific name being then most pronounced, as can yet be seen on the young specimens exhibited to-night. It is of interest that these geckos have hatched out at the present time (June), and also the time taken to hatch—viz., 207 days, or nearly seven months, as well as the small number of eggs laid by the female. Mr. Dixon has just informed me that, although he has also seen great numbers of this gecko, he, like myself, has never yet come across one of this species under a stone.—H. W. Davey, F.E.S., 16th June, 1924.

"Flora of South Australia," Part II.—Another of the handbooks of the flora and fauna of South Australia, issued by the British Science Guild (South Australian branch), has just been published. This part comprises the second third of the plants of South Australia, and is the work of Mr. J. M. Black, the author of the first part (with the exception of the Orchidaceae, which was contributed by Dr. R. S. Rogers). Arranged under the system of Engler, this part comprises the families Casuarinaceae to Euphorbiaceae inclusive, extending to 203 pages (5½ × 9). A third part will complete the work, which will be of great advantage to students of South Australian plants. It contains twenty-four full-page plates and about 120 figures in the text, all by the author of the work. These are most useful, as they give in many cases dissections of the flowers variously enlarged. No attempt has been made to record a vernacular name for each species, but where a fairly universal one exists it is given. Turning to the Acacias, we find eighty species listed, among them *A. rivalis*, J. M. Black, "Silver Wattle," *A. decurrens*, var. *mollis*, Willd., being "Black Wattle" and "Silver Wattle" (*A. dealbata* does not occur in South Australia), while *A. armata*, R. Br., "Kangaroo Thorn," does not claim Kangaroo Island as one of its habitats, as is usually believed. *A. rhetinodes*, Schlecht., appears to be the correct spelling of the specific name, as it is derived from the Greek *rhetinodes*, resinous. Apparently, according to the rules of priority, the Sturt Pea must henceforth be known as *Clianthus speciosus* instead of *C. Dampieri*, as named by Allan Cunningham. That the work has entailed a tremendous amount of research on the part of the author is apparent in every page. It will be found equally useful by Victorian botanists as by those of the sister State. The published price is three shillings. Other volumes of this series which have been issued are Fishes (6s.), by Mr. E. R. Waite, F.L.S., and Mammals, Part I. (4s.), by Dr. F. W. Jones. About twelve more are in course of preparation.

The Anakie Heath, *Choristemon humilis*, H. B. Williamson.—I have ascertained that previously to my gathering the specimen from which this plant was described and figured in the March *Naturalist* (vol. xl., p. 231), a specimen had been handed to me by my companion and guide, the Rev. A. C. F. Gates, M.A., by whose good offices the excursion was made possible. As no significance was attached to the find at the time, this was inadvertently overlooked by me, and I regret that the name of Mr. Gates as first collector was omitted from the description in the *Naturalist*.—H. B. Williamson.

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The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria.

Published 7th August, 1924.

Hon. Editor: F. G. A. BARNARD, Esq.

The Author of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 11th AUGUST, 1924.

1. Correspondence and Reports.
2. Election of Members.

AS ORDINARY MEMBER—	PROPOSER.	SECONDER.
Mrs. R. W. Wilkinson, Alma-road, East St. Kilda.	Mrs. E. Bage.	Mr. J. H. Harvey.
Mr. R. W. Wilkinson, Alma-road, East St. Kilda.	Mrs. E. Bage.	Mr. J. H. Harvey.
Mr. A. J. Day, 199 Toorak-road, South Yarra.	Mr. F. Cudmore.	Mr. C. Daley, F.L.S.

3. Nominations for Membership.
4. General Business.
5. Remarks by Exhibitors relative to their Specimens.

   Ten minutes' adjournment for discussion of Exhibits.

6. Reading of Paper and Discussion thereon.

   1. By Mr. F. Pitchers—"In the Strathbogie Ranges."

   2. By Dr. W. MacGillivray (Broken Hill).—"An Excursion in South-Western Queensland."

   The committee will be pleased to receive promises of papers for future meetings.

7. Reading of Natural History Notes.

   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

   Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and *Naturalist*. Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Club year ended on 30th April last. Any subscriptions overdue should be forwarded to the Hon. Treasurer *at once*.
Subscriptions for the year 1924-5 became due on 1st May.

SPECIAL NOTICE.—The attention of members is directed to item 8 of business paper. Notices of exhibits should, if possible, be type-written.

"VICTORIAN NATURALIST."

Until further notice back volumes of the *Naturalist* (unbound) will be available to members and non-members of the Club at the following prices:—Vols. 2, 3, 4, 9, 20/ and 25/; Vols. 1, 8, 33, 10/—15/; Vols. 5, 6, 7, 19, 21, 23, 24, 25, 27, 29, 30, 31, 32, 34, 35, and 37, 5/—7/6; Vols. 10 to 18 (*inc.*), 20, 22, 26, 28, 36, 3/—4/. Some single back numbers can be supplied at 3d. to 1/ each, according to stock in hand.

A few back numbers of the *Southern Science Record* are available at the following prices:—Vol. 1, Nos. 6 to 13 (inclusive), 6d. each; Vol. 1, Nos. 4 and 5; Vol. 2, Nos. 1, 3, 4, 5, 6, 7, and 9, 1/ each.

The Victorian Naturalist.

Vol. XLI.—No. 4. AUGUST 7, 1924. No. 488.

FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 14th July, 1924.

The president, Mr. J. Searle, occupied the chair, and about fifty members and visitors were present.

REPORTS.

A report of the visit to the Geological Museum on Saturday, 21st June, was given by the leader, Mr. A. E. Rodda, who said that, by the courtesy of Mr. W. Baragwanath, the Director of the Geological Survey, the museum was made available for the visit of the members of the Club, about twenty of whom spent a very interesting afternoon in the examination of the fine collection of rocks, minerals, &c., displayed. In addition, a number of slides of diatoms and foraminifera were examined under the microscope.

In the absence of the leader, Mr. F. G. A. Barnard, a report of the excursion to Mitcham on Saturday, 5th July, was given by Mr. C. Daley, B.A., who said that he was one of a party of several members who missed the appointed train, and, arriving at Mitcham late, did not catch up to the party led by Mr. Barnard, and so could not say what his party had observed. However, he and his fellow-members had spent an enjoyable afternoon rambling through the paddocks, where a fair amount of the Common Heath, *Epacris impressa*, principally the white variety, was seen.

[Mr. Barnard reported subsequently that, with a party of about a dozen members, he had walked towards the Deep Creek *via* Quarry-road, and thence through the bush to the Lilydale-road. Heath was not as plentiful as expected, but sufficient was obtained to satisfy the desires of the party. Early blossoms of two Acacias, *A. myrtifolia* and *A. verticillata*, *Correa speciosum*, and a few spring flowers, were noted.]

ELECTION OF MEMBERS.

On a ballot being taken, Mr. D. M. Ebbs, 6 Fernhurst-grove, Kew; Mrs. V. Miller, Lambeth-place, St. Kilda; Miss C. Quarterman, 4 Canterbury-road, Toorak; Mr. T. J. James, 110 Maling-road, Canterbury; Mr. W. Mohr, 9 Marine-parade, St. Kilda; Mr. J. M. Sinclair, 700 Burwood-road, Hawthorn; were duly elected ordinary members; and Miss J. Curdie, c/o Mrs. A. J. Black, Mount Noorat, *via* Terang, as a country member of the Club.

GENERAL BUSINESS.

Mr. C. L. Barrett, C.M.Z.S., called attention to the great destruction of wild-flowers going on in every direction. He considered it time for the Club to see what protection could be afforded to the fast-disappearing native flora, and drew particular attention to the practice of visitors to heath districts gathering such large quantities of that favourite flower. He also thought that collectors of orchids should refrain from digging up quantities of plants for home cultivation, which, as a rule, was unsuccessful.

Mrs. Coleman also deplored the destruction which was going on, and made some valuable suggestions as to the gathering of wild-flowers for the annual exhibition. These might be sent to intending exhibitors with the hope that greater care would be exercised in collecting exhibits. Miss Nokes, Dr. Sutton, and Messrs. Williamson, Daley, Pitcher, Oke, and Searle also referred to the importance of Mr. Barrett's suggestions.

Mr. Barrett referred to the way in which flowers and shrubs were protected in the United States of America, and more particularly in California, and thought that something similar might be done in Victoria. He moved—"That the committee be asked to consider means for protecting the native flora and of remedying the mischief already done." This was seconded by Dr. Sutton, and carried unanimously.

PAPER READ.

By Mr. J. Stickland, entitled "The Aquatic Protozoa of the Melbourne District, Part II."

The author, in continuation of his paper in the *Naturalist* for August last (vol. xl., p. 65), in which he dealt with the class Sarcodina, described the class Mastigophora, the individuals of which are provided with flagella for purposes of locomotion, &c. In this group the boundary between plants and animals was completely obliterated; hence many forms were claimed by both botanists and zoologists. Representative local species of the various orders were described and illustrated by large-scale drawings.

Mr. H. B. Williamson congratulated the author on the interest of his remarks, and suggested that a "pond-life" night might be arranged, which would place members more in touch with the subject of the paper.

The president mentioned the interesting tests that could be made in phototaxis and galvanotaxis in the group dealt with —the Infusoria—and gave examples of the galvanotaxis of several species, demonstrating how the experiments could be carried out.

EXHIBITS.

By Mr. C. L. Barrett, C.M.Z.S.—Several species of South African ants, including *Messon barbarus*, the species mentioned in the Bible ; also males and workers of the Driver, or Legionary Ant, Dorylus, sp.

By Mr. J. E. Dixon.—Scorpions from various Victorian localities—Ouyen, Lake Hattah, Natya, Mount Arapiles, Castlemaine, Gippsland, and Karn, Broken River, being probably six different species.

By Mr. A. E. Rodda.—A "bull-roarer"—an instrument used by the aboriginals during ceremonial gatherings, from North Queensland.

By Mr. J. Searle.—Photomicrographs of the protozoan, *Diplodinium ecaudatum*, stained by Mallory's connective tissue stain and Heidenhain's iron hæmatoxylon stain, to show the neuromotive apparatus.

By Mr. A. J. Tadgell —Blooms of *Acacia verniciflua*, Varnish Wattle, grown at Sandringham. This Wattle produces abundance of flowers, and grows well in poor soil. A pretty effect is produced if the Western Australian Sarsaparilla, *Kennedya pentaphylla*, can be grown as a background to the Wattle, the sky-blue flowers of the creeper blending well with the deep yellow of the Wattle.

After the usual conversazione the meeting terminated.

"The Old Pioneers' Memorial History of Melbourne." —This recently-published volume of about 500 quarto pages, profusely illustrated with maps and drawings, though not containing many references to natural history, is well worth perusal by field naturalists, most of whom should be of a literary turn of mind, and interested in what has gone before. The author, Mr. Isaac Selby, has succeeded in getting together a vast amount of information about men and women who were foremost in the foundation of our city and State, many of whom have left indelible marks on the days that have come after, and he is to be congratulated on having carried out such a self-imposed task so well. The price of the volume is twelve shillings and sixpence, and the profit on the sales is to be devoted to a lasting memorial of those pioneers whose resting-place in the Old Cemetery, West Melbourne, has recently been resumed for market purposes, in spite of the protests of relatives and friends—an example of utility before sentiment.

MOUNT BOGONG AND ITS FLORA.

By Alfred J. Tadgell.

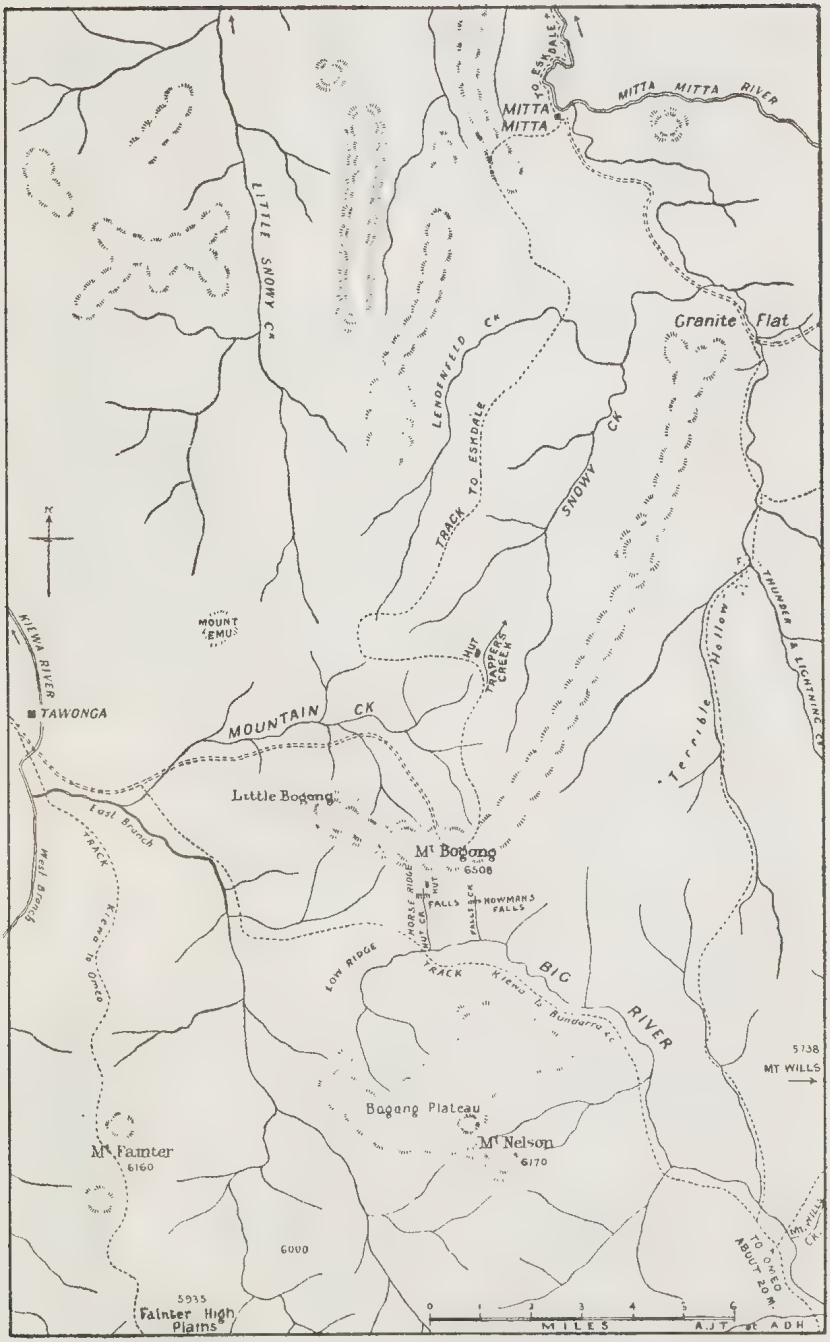
(*Read before the Field Naturalists' Club of Victoria, 16th June,* 1924.)

With my friends, Messrs. Blagdon and Hooke—the latter your esteemed honorary treasurer—I spent a fortnight last Christmas, as well as part of January and February, 1923, on Mount Bogong, Victoria's highest mountain. Its remoteness from the capital may be judged by the fact that Bright is 210 miles from Sandringham (Melbourne), Tawonga 24 miles further, and Mount Bogong Hut (by horse) yet another 24 miles. You will perhaps realize the distance better if I say that our train journey from Sandringham began at about 5 a.m., and ended at Bright at 5.30 that afternoon. We were in our conveyance for Tawonga within an hour later, arriving at our guide's house at 10 p.m. Next morning at 6.45 we were in the saddle, and arrived at the hut on Mount Bogong at 7 p.m. that evening. The journey even takes longer in returning, as, though we left Mount Bogong Hut at 10.30 on Thursday morning, facilities did not allow of our reaching home till Saturday at 4 p.m.

We do not advise, unless experienced, that the traveller essays Mount Bogong unaided. One traveller we met set out from Tawonga in the morning, but had returned by evening. Guide maps direct, but lines are not shown on the countryside. There are few indications, many blind gullies, spurs innumerable, and rough country.

The Tawonga valley gives one a sensation of pleasure, as one misses the desolation of the Ovens Valley, through sluicing operations, and the St. John's Wort, though Californian Stinkweed, *Gillia*, is in evidence. The Kiewa River, known to the aborigines as the Ki-ee-wa (flowing waters), commands our first attention. A great natural barrier, part of the High Plains, under Mount Bogong, acts as a buffer and throws the waters of the Big River away to the east, and those of the Kiewa, which absorbs the Mountain Creek, towards the north. At the mountain end of the valley the river has two main branches, known as the eastern, rising under Mount Bogong, and its high plateau, and the western, having its source in the Diamentina, under Mount Hotham. A large delta-like area takes in Mount Beauty and beyond. The branches join near the local post-office or township of Tawonga.

The river bulked largely in the report of the Commission on the Kiewa Hydro-Electric Scheme in 1919, and later in that of its engineer. Much was expected from the scheme in the development of the North-East of Victoria. Storage basins were to be constructed under Mount Bogong and the High Plains at 3,000 feet, using the Rocky Valley and Pretty Valley



MOUNT BOGONG AND ITS SURROUNDINGS.

branches of the East Kiewa. Statistical information is still being gathered from the High Plains.

On our two occasions of enforced waiting we botanized several miles up both the east and west branches of the Kiewa. The residents are rather proud of the Red Cypress Pines, *Callitris calcarata*, on the banks of the eastern branch, and local tradition ascribes their being brought by aborigines from a considerable distance.

Leaving our guide's house on the West Kiewa, a road takes us first north, then east. Before a mile has been traversed our pack-horse is seen struggling with a shifting pack, and falls, with our food and belongings under him. In a couple of miles we are crossing the wide stream of the East Kiewa, and a pretty picture is made by our horses splashing in the sunlight-reflected water. The tall Narrow-leaved Lomatia lines the banks of the stream, with the Slender Tea-tree, *Leptospermum attenuatum*, a handful of whose astringent fruits our guide carries in his pocket as a useful bush medicine. The last settlement is soon passed, and we no longer hear the hum of milking-machine motors. Splashing across Mountain Creek, we pass through a mile or two of rich grass flats, in which from time to time may be seen traces of a track, and halt near the junction of Soda Creek, whose mineralized water our guide advises not to drink too freely. We are here about 2,000 feet high, and seven miles of the journey have been completed. At our backs is a spur, once used as a cattle track up to Mount Bogong, but since discarded owing to the steep grade and its roughness. The rosaceous burr, Bidgee-widgee, *Acaena sanguisorba*, a common plant, grows around us, an infusion of which is used by local bushmen as an eye-wash, and which, twenty years ago, I found an effective astringent on a trip to Mount Kosciusko. The Prickly Currant-bush, *Coprosma Billardieri*, abundant about here, is, in February, loaded with its bright scarlet, edible berries, that look like red currants. Strap Ferns, *Blechnum* (*Lomaria*) *Pattersonii*, and others line the banks of the creek, while the "Common" Spleenwort—which, by the bye, is rare as a Victorian fern—and the Small Rasp Fern, *Doodia caudata*, are to be found among the rocks. Twice we cross the creek and climb out to the drier spurs, keeping on the highest ridges up to 3,000 feet. Numerous holes made by the Wombat, *Phascolamys latifrons*, are passed, and although our guide shouts a warning, a rider is seen struggling as his horse turns a somersault; but by wonderful dexterity he falls clear, a little shaken, though without damage even to his eyeglasses, while in another moment he had caught and remounted his horse.

On our first visit, though the ridge at 4,000 feet leads

southerly and direct over the Mount, circumstances compel our guide to make a detour to the north-east to locate the Trapper's Creek hut, so we descend over a saddle of the range for three miles into a wide valley, on the opposite water-shed. We cross miry country and push through under-scrub that brushes our heads roughly and has no respect for our clothing. A bad take-off when his horse jumps a log causes a broken saddle girth, and another rider is precipitated on to his shoulder, still no damage.

Trapper's Creek at 3,000 feet is seen with overhanging Myrtle Beech and Sassafras trees, and we emerge on to the cattle-yards of the grazier and a nicely-built hut 15 x 11. It is a useful shelter, a kind of half-way house, where the cattle spell a night before the final ascent to the top, still twelve miles distant. It is situated on the Eskdale to Mount Bogong track, near where there is an indicator fastened to a tree—"To Granite Flat"—but this track will be found to be overgrown. The hut is not hard to locate if general directions are followed, and the saddle of the ridge found. A recluse dwelt in the hut for a number of years, finding a living trapping native fauna. Overnight we had puzzled at a notice a wag had fastened on the door of the hut, which read, "Look under the bed for strangers"; but some of us slept on the floor, on gum leaves, and we did not realize his joke until next morning, when Mr. Maddison killed a good-sized snake before we had proceeded far. Snakes, however, we found scarce, while we saw no foxes.

The mighty Bogong now stood out in all his majesty as though challenging us to scale him, while his long spurs acted like buttresses for his bulky side. Our trail along the ridges from Mountain Creek had shaped itself into the form of a horseshoe, and a well-worn cattle track was met and followed to the hut beyond the summit and on to the opposite side. Snowdrifts increased in size and in number, and my friends began to develop plans for a toboggan, made later, and which at Christmas time they were able to enjoy to their hearts' content. Beyond the wide Mountain Creek depression on our right hand there is a splendid view that culminates in the Kiewa Valley in the west, while to our left hand, looking easterly, there is the deep vale of Lightning Creek, with "Terrible Hollow." The ridge dips again at 3,700 feet, and we dismount to ease our horses up the steep slopes of the "Pinch." A nice creek is crossed at 4,000 feet, and large Snow Gums, *Eucalyptus coriaceum*, var. *alpina*, and Silvertops, *E. Sieberiana*, intermingle. At 5,000 feet we find ourselves among dwarfing eucalypts, ghostly and bleached, with the remains of a young bullock, that has gone down from exhaustion among the

tangled Snow Gum jungle during last mustering, when heavy snow made the going almost impassable.

Mount Bogong is now only separated from us by a narrow and steep connecting ridge, down the slope of which our guide has known more than one beast to fall and fail to return. We are at last on the side of the mountain, and the panorama extends for 50 miles. Mount Kosciusko, with several peaks, Gibbo, Pilot, The Cobboras, are on the eastern sky-line, while, looking back northward, a wondrous view is seen of broad river valleys—the Mitta and others, to the River Murray, lost in a sea of ranges, far beyond the New South Wales border. We feel, with Hazlitt, that "we are surrounded with the constant sense and superstitious awe of the collective power of matter—of the gigantic and eternal forms of Nature, on which from the beginning of time the hand of man has made no impression."

The final effort has been too much for "Sam," our pack-horse, who, for the second time, struggles with his burden, but is only prevented from sliding further down the mountain side by again lying on our provender and by a rush of arms that held him back. At the top of the slope a wide expanse of snow causes us to make a detour from the track, and at the same time the aneroid perceptibly falls when the intensified warmth and sunshine of the lee side of the mountain are no longer afforded among the many large snowdrifts of the summit.

We had no petrologist with us, so only a few specimens were collected as we made the spurs leading up to the summit. They are laid on the table this evening, and show the decomposed state of some of the rocks. They may have a little interest, perhaps, for some of our members. My friend, Mr. J. T. Jutson, tells me that they consist mainly of specimens of metamorphic gneiss (mica schist or phyllite), pegmatite, felspar, with large plates of white mica (muscovite) and milky white quartz, with black bands of a mineral that Mr. Rodda says is tourmaline.

Rain, sleet, snow, and losses by the cattlemen on Mount Bogong were reported at this time (June) last year by the press; but the winter season is not the only time an uncharitable welcome will be received from the Spirit of the Mount. On our arrival on top, at the end of January, 1923, we were greeted with stinging hail, sleet, and painful cold. A few days later we were witnesses of one of the Mount's peculiar phenomena. A wall of thick bush-fire smoke, after first filling the valleys and obscuring the hills on the north side, gradually crept up Mount Bogong and banked up for several miles along the crest, as the air from the south met and checked its further movement.

Writing from Omeo in December, 1854, to Sir William Hooker, of Kew Gardens, England, Baron von (then Dr. F.) Mueller

tells that he is the first and only white man who has ascended the two highest summits of Bogong, and he has named them Hotham and La Trobe, in honour of two of the Colony of Victoria's Lieutenant-Governors. He added that on these ranges he found the boiling-point to be 198° Fahr. He expressed disappointment that the vegetation of these lofty Victorian mountains did not boast of as many peculiarities as he had anticipated, for, as he said, the Australian highlands reflected Tasmanian forms. Mount Latrobe has since been often ascended. Mr. Black, the Surveyor-General, trigonometrically measured it as 6,508 feet above sea level, and found it to be Victoria's highest mountain. It now bears the name of Mount Bogong.

In 1886 Dr. von Lendenfeld and Mr. James Stirling explored the Victorian Alps together geologically. In their report to the Victorian Mining Registrar, March, 1886, they fully describe the difficulties of their journey in January, 1886, to the summit, from the Omeo or eastern side. Mount Bogong is situated at the northern end of a high plateau or massed elevation, extending for sixty miles between the Mitta River in the east and the Kiewa River in the west. The mount is divided from the southern portion of the table-land by the deep ravine of the Big River, a tributary of the Mitta, and is connected with it by a low, rocky ridge. The explorers further explained that Bogong got its name from the caterpillars of a night moth. These caterpillars are called "Bogong" by the aborigines, and, being exceedingly abundant at certain seasons of the year, were half-roasted and formed a favourite food at their "Bogong" (or "Bugong") feasts. (A juicy grub would certainly be more palatable than a winged insect when singed.)

Mount Bogong itself forms a long ridge, the slopes of which on the north and west are very steep and rocky, those on the south side less so, while those of the east have a more gradual slope still, but only a few spurs are passable for horses. It extends from west to east about five miles, slightly curving to the south, and appears as a bald, isolated and almost inaccessible mountain even in the near distance It is about half a mile broad, with slightly undulating summits of three elevations, about a mile apart, and of about the same height. At the centre of Mount Bogong, on the north-eastern of the summits, and at the highest point of 6,508 feet, there has been erected a large, high, and well-built cairn, on which time has left little trace. Another smaller cairn was built at the south-west summit by the geodetic survey where the Mount overlooks Mount Buffalo and the beautiful Kiewa Valley, and in the near distance Little Bogong, 1,000 feet lower. This latter is difficult of access, as tangled scrub and rocky outcrops impede progress so much that my legging came off, and I did not miss

it for some time until too late to recover it. If the intervening space between Mount Bogong and Little Bogong were made easier to cross, as no doubt it will be for tourists some day, judging from the Ministerial visit to Tawonga, and the promise made by the Minister to a recent deputation, Mount Bogong will come into its own and be fully appreciated, as the distance from Little Bogong to the Kiewa River crossing is only about five miles, while the distance between the upper and lower summits is about a mile and a half to two miles. Now the distance from Tawonga to Mount Bogong is twenty-one miles. I am not saying that a motor-car or buggy will make the trip in so short a distance, but a good horse track would not be a very expensive work, and the return journey will be as easy to accomplish in a day as is the trip from Harrietville to Mount Feathertop, which is taken by so many. What finer scenery could be had? The view from Mount Bogong is regarded as the finest in the Alps.

In describing the geology of Mount Bogong, Mr. Stirling states that, although marked "granite" on the map, it is really gneiss (a hard, crystalline rock of thin layers, mainly of the same material as granite). It is a highly metamorphosed sedimentary rock, outcropping, and forming escarpments on the north and west sides of the mountain near the summit. Blows of white milky quartz are frequent, and stand out prominently. Lower down the Mount, the rock is transmuted into metamorphic granite, quartz, white felspar, and dark brownish-black mica. Rounded and flattened masses of basalt-like rocks—quartz porphyrites—occur, which, he thinks, are transported boulders derived from Mount Nelson, twelve miles to the south, at the extremity of the High Plains. Von Lendenfeld adds that, on the summit of Mount Bogong, the metamorphic gneiss has retained its stratified character. It will thus be seen that the geological structure of Mount Bogong differs from Mounts Hotham and Feathertop. The summit of Hotham is a recurring mass of argillaceous greyish and bluish slate, alternating with siliceous and felspathic sandstone, some of these argillaceous members being full of anastamotising seams of quartz, while on the eastern slopes, near the Omeo road, are basalt outliers, and sedimentary rock is exposed in the cuttings."

Arrived at the mountain top of Bogong, at 6,450 feet, one views the cairn for the first time, and leaves it a few hundred yards on the right hand, while one follows the well-worn cattle track for a good two miles along the grassy crest of the mountain, bearing south-east, and heading for the grazier's hut on the opposite slope. We pass what our guide denominates a "rocking stone"—an oval, water-worn stone about twelve inches long, lying in a hollow cradle of a huge rock. The

rocking stone is now loose as the result of exposure to the elements. This may be part of one of the transported masses of stone that Mr. Stirling refers to, in what he thinks is glacier action, near the summit. Snow Gums, protected somewhat by the dome-shaped mountain mass, are reached at 6,000 feet, and the track continues through them for a quarter of a mile before leading down for another half a mile to the hut at 5,900 feet, where the valley closes in.

Without direction it would be difficult to locate the hut, but a good indicator is the depression on the south-west side leading to the commencement of a stream that springs out of the mountain, and whose rocky bed soon shows deep erosion from melted snow waters. This is close to the first Snow Gums, and to the right of them. The hut cannot be seen from here, as it is situated among the trees, close to the creek, but it is "a hollow in the hills,'" suggestive of where one would naturally look for a camp. If the stream be followed for half a mile in a westerly direction the hut is passed before the creek takes a southerly trend, as it follows parallel, under the horse ridge, a spur leading down, by an easy grade for a horse to the Big River, which it joins at about 4,000 feet. It requires a walk of 2½ hours from the hut to reach the Big River, but the journey on return will take 4 hours, as part of it will be through very rough and dry tangled Snow Gum scrub, while steep slopes occur towards the river bank.

The Big River, a swiftly-flowing, pellucid mountain stream, 25 feet wide, is spanned by a fallen tree bridge, and its many rapids and deep holes suggest good trout fishing. The river's straight outline is like a liquid road for more than a quarter of a mile through the overhanging vegetation when viewed from its banks. We cross the old mining pack track from Tawonga towards Omeo, and follow it over the river a little, as it leads up to Mount Nelson and the High Plains.

The grazier's hut, which is the only dwelling on Mount Bogong, is an erection that has defied the elements for many years, and one can imagine the packing of the stout iron for the roof from Tawonga in those rough old days, and the difficulties for twenty-four miles of a horse with such dead weight. In imagination we follow the horse up the steep slopes where the rocks on edge and the sharp-sided razor-backs make foothold so uncertain that even we are glad to dismount, though the day is windless. The hut is built very strongly of chocks and logs and dab, with a capacious chimney and doorway occupying the whole of the north end of the building. A glance at the structure, and one would think it proof against wind and rain, as its position was chosen, not only because of the abundance of wood and water close by, but for the shelter that the mountainside affords, while the last rays of the setting

sun give as much light and warmth as possible when the days grow shorter. We found, however, by the splash of rain on the sleepers' faces at times, how searching are the elements on a boisterous night, when, as we lay in bed, we would listen for the rush of mountain wind up the valley, till it struck our home and caused it to shiver. But what pleasure can be more joyous than to hear the rain pattering on the iron roof of a hut when you know that you are safe within, and you watch the blaze of the huge log fire, provided the wind is not driving the smoke down and filling the hut, kept up well into the night! It is only in the early hours or the morning that you are looking for the extra blanket. The hut remained a faithful friend to us, though it must lie buried under the midwinter snow many feet deep.

Daybreak was heralded by Red-tipped Pardalote's unceasing call, "Which-ee-coo, which-ee-coo," thrice repeated in quick succession. From sunset till dark he was back, again restlessly breaking the silence. Scarcely a mile from the hut, on the southern slope, as one looks towards Mount Nelson, one takes a rough scramble into the bed of the creek, aided by tall Grevilleas and Mountain Plum Pine, *Podocarpus* (*Nageia*) *alpina*. One arrives at a nice cascade, over which a good flow of water runs. Here our new fern, *Cystopteris fragilis*, luxuriates, bathed in the spray from the running stream as it shelters under the rocks or in their crevices. Almost immediately a sudden drop reveals a waterfall of some thirty feet. Again one works out to the high mountain side near by, which still overlooks Mount Nelson and the high plateau, and, as one pauses for breath, one's attention is arrested by what, if they were anywhere else, might be mistaken for three newly-made unrolled macadamized roads, or long shoots of loose stones from some mine near by, and running down the mountain side for 100 yards. On investigation they prove to be talus, caused by the weathering of the mountain's escarpments; and very difficult these loose masses of stones prove to us to walk over, on the steep slope of the range. Returning to the ridge overlooking the hut, where the Snow Gums commence, and where our creek rises, we pass for half a mile by a gradual fall on to the east side of the mountain. Here is the salt-lick flat of the graziers, where salt is put out for the stock. It is somewhat swampy just now, and out of the soddened ground a creek soon forms to join those that flow later to the Big River from this side. Two fine sphagnum moss beds are close at hand, fed by the melting snow and springs.

By the end of February the Sun Orchid takes possession, and countless sky-blue flowers of *Thelymitra venosa* give beauty and delight the eye of the flower-lover. The outlets of the sphagnum beds are rushing creeklets that join that from the

salt-lick flat. In the pools of the latter we find an interest, not only in the plant-life, but in numerous tadpoles disporting themselves, while hard by, on hearing the call, we collect the Golden-yellow Frog, *Hyla ewingi*. The height, 5,800 feet, seemed to us interesting and unusual, as the frogs must have hatched out while the snow lay on the ground, and ice made the water very cold. As a matter of fact, there was still abundant snow but a few yards distant, extending in an unbroken drift for a mile or more. On referring the matter to Mr. Jas. Kershaw, of the National Museum, that gentleman was kind enough to identify the frog and supply me with a note, stating that the occurrence was not unusual for this widely-distributed species.

About a mile east from the sphagnum beds, after the valley has widened considerably, it once again contracts into a rocky flat, and a nice series of cataracts are passed. We thought at first that this was "the bit of a fall" to which the graziers had referred, but my ever-energetic companions, Messrs. Hooke and Blagdon, always on the look-out for something new, were not long in making a discovery of importance. The stream was running fast, along a narrowing bed, when the country showed a deep depression, and a valley was seen, hemmed in on all sides by steep hills. Suddenly the water was precipitated over a rocky face, estimated by us at 130 feet, by three clear drops of nearly 50 feet each, depositing the water into a large, rocky pool below. Howman's Falls are worthy of Mount Bogong, and the natural swimming pool was not long in being tested, though the icy water did not allow of the swimmers remaining long in the bath, but quite long enough for a photo. to be taken of them in their pleasant surroundings.

A curious circumstance is that of another face over which no water flowed on either of our two annual visits. This face almost adjoined, was of the same height, and its dry basin and the water-worn condition clearly showed that at one time it must have been the original fall and the channel's course, but how it had been deflected the precipice and approach did not permit of our examining. Animal life is absent from the mountain, although at one time, it is said, there were large, fierce, half-bred dogs running wild with dingoes. Only a brown-coloured porcupine ant-eater, *Echidna aculeata*, was run to earth, from which our dogs in vain tried to dislodge it.

Large black-winged insects with red blotches, grotesque in appearance and slow in movement, beautifully-coloured Locustidæ, leisurely moved back to the rocks when disturbed. Eagles, Kestrels, Hawks, Crows, Lory Parrots, and Pardalotes could be heard and seen almost to the summit. In fact, this seemed a common meeting-ground for several large individual flocks of Raven Crows, at whose gatherings something of very

grave importance seemed to be discussed, for on a sudden they would all take wing, and, after a deal of cawing, would re-assemble and begin the discussion over again. Shortly after sunset millions of Bogong moths were to be seen, all flying eastward in one direction, and not flying hither and thither, as is their bent elsewhere, and, although such a large number, they did not seem to impede each other's flight. At the same time there were to be found on the stones in the creek hard by hundreds quenching their thirst, and, although the water ran strongly, covering part of their bodies and wings, they held a firm grip with their feet for several seconds before flying off. It would seem difficult to drown these Cut-worm Moths, *Agrotis infusa*, as they easily recover the banks of the creek if by chance they get into the water.

A fourteen-mile walk from the hut for the full length of the mountain crest, "over the top" and down on to Little Bogong, and back, provided a good and varied day's outing after our horses had left. As there was no spring water available we made our tea from a snowdrift. The smoky taste of the tea caused our cook to be censured, but, as our guide informed us that when the snow waters came down into the Kiewa River at Tawonga it was similarly tainted, we wondered at the cause. On referring the matter to the Government Meteorologist, he explained to me "that the peculiar flavour was caused by the soot from bush-fires, brought down by the rain and snow, a matter previously reported to him." Perhaps the light atoms remain in suspension in the same manner as those that cause the phenomena called the red and sulphur-coloured snow of Europe.

There is, as far as I am aware, no separate extensive list of plant-life that has been collected on Mount Bogong, so I am appending a list as a "contribution to the flora," showing at what heights over 4,000 feet the plants were collected. This gives 256 native species, 28 varieties, 13 immigrant weeds, also 24 species of mosses, &c. In the *Victorian Naturalist*, for March, 1904 (vol. xx., p. 156), there is a short account of a visit to Mount Bogong by Dr. C. S. Sutton and Mr. G. Weindorfer, but the visit only allowed of a hurried stay on top of a little more than an hour, and then under unfavourable conditions. Twenty-seven species of plants were recorded at over 4,000 feet. May I express my admiration of these enthusiasts who went up and down the mountain in one day, as you would agree with me that a journey one way in twenty-four hours is quite sufficient, especially with pack-horse and impedimenta. That indefatigable worker, the late Mr. James Stirling, collected over our Australian Alps, and made a comprehensive survey recording its flora at varying heights and many collecting grounds, listing Tasmanian and Australian alpine, with other plants, even comparing our flora with that of part of Scotland and

Antarctica. In his report to the Mining Registrar, and in a paper read by him before the Botanical Society of Edinburgh on 12th February, 1903, he specifically mentions eighty species of Mount Bogong plants, exclusive of two species of Muscæ. Most of these appear under the initials "St." in Prof. Ewart's "Flora of the Victorian Alps" (*Vict. Nat.*, Oct., 1910, vol. xxvii.), but in this last list no collecting grounds or heights are given.

In my list some of the plants are shown to have a higher range of elevation than that recorded by Mr. Stirling. Evidently some of the species collected by this gentleman were not submitted to the Government Botanist for confirmation, or recorded by the National Herbarium of Victoria. I fear that some of the plants must be regarded as doubtful records. Indeed, some are left out of the "Census of Victorian Plants" recently published by this Club. Thus, *Dichosciadeum ranunculaceum* (*Azorella dichopetala*), *Olearia* (*Aster*) *rosmarinifolium*, *Plantago stellaris*, *Euphrasia antarctica*, *Ranunculus anemoneus* are not regarded as valid Victorian plants. *Brachycome exilis* is included, but this is a small annual not recorded for the North-East, and hardly likely to endure the rigorous conditions of Mount Bogong. *Stylidium* (*Candollea*) *serrulata* is now included in *S. graminifolium*. It may be found that *Colobanthus subulatus* (*C. Benthamianus*), which I have not collected on Mounts Feathertop, Hotham, or Bogong, may have been mistaken for *C. Billardieri*, whose leaves are not subulate, and which is common on Bogong. When I first found it on Mount Hotham, in 1915, it had previously been regarded only as coastal (*vide* p. 144, Proc. Roy. Soc. Vict., vol. xxix., part 2, 1917). *Acacia alpina* and *Boronia algida*, though common between 4,000 feet and 5,800 feet on the Mount Hotham portion of the Alps, must be rare if found on Mount Bogong, as we did not find either of them. I sought for them both, down to 4,000 feet, on the north and south, and as far as 5,000 feet on the east and west slopes, as well as the on summit, but without success. Mr. Stirling mentions the Acacia as widely distributed—"Mount Bogong, ascending to the rocky summits of the eastern points"; while the Boronia, he states, "grows on the rocky slopes of the mountain." Could *Podolepis acuminata* also, which we could not find, have been mistaken for *P. longipedata* when out of flower, abundant here, and so robust that Mr. Maiden spoke of similar plants on Mount Kosciusko as like young lettuce plants. I have yet to collect *Cotula alpina* from these Alps. The fern *Pleurosorus* (*Grammitis*) *rutifolius*, collected by Mr. Stirling at 6,000 feet, may probably be *Cystopteris fragilis*, that I recorded last year. My own notes say that, when dry, the fruit masses merge, and they lose their individual character, reminding one of Grammitis.

Both grow in crevices of rocks. Mr. Stirling found *Aster glandulosus* at 5,800 feet; my Olearia (Aster) found at that height is *O. ramulosus*, var. *communis* (the minute-leaved form).

I have fully availed myself of the generous assistance of the gentlemen connected with the Melbourne National Herbarium, and Messrs. Audas and Morris have been kind enough to go to a lot of trouble to compare specimens for me with those in their large and varied collection, and have retained a large number I have sent them.

The following plants have been added to the Census as the result of our two Mount Bogong trips:—*Carex pyrenaica*, *Cystopteris fragilis*, a new species of the orchid genus Caladenia which Dr. Rogers will shortly publish the name and description of, *Ranunculus Muelleri*,* the variety *oblongatus* of *Erigeron pappochroma*, while a new locality has been listed for *Olearia ramulosa*, var. *communis*, and *Trichomanes humile*. It was through my horse getting away from me while I was botanizing down a steep slope, and by having to follow on foot for two miles, that I found the Felted Buttercup on the summit.

Some of the plants collected are worthy of notice. A form of *Erechtites hispidula* assumed a beautiful beet-root red all over its foliage. The white forms of *Hovea longifolia* and *Dianella tasmanica* do not seem to have been previously noted. We also found white forms of *Stylidium graminifolium* and *Viola betonicifolia*, though we did not see *Viola Caleyana*. *Veronica Derwentia*, which usually has bluish-white corollas, was found in groups with bright pink colouring. The plants marked in my list with ? were not sufficiently advanced to name other than vegetatively, as *Prostanthera incisa*, at 5,000 feet would be new for N.E., and *Tristania laurina* at 4,000 feet, neither of which could be found in fruit or flower. Some of the rarer alpine plants were found to be by no means uncommon here. Some were even abundant—*Didiscus humilis*, *Acyphilla simplicifolia*, *Exocarpus nana*, four species of orchids, the Edelweiss, Wheel Heath, and Podolepis. The Hoary Sunray was a miniature flower show, with 110 flowers in a radius of little more than one foot square. On the other hand, such plants as *Daviesia ulicina* and *Helichrysum rosmarinifolium* were uncommon or very local. The Royal Grevillea, *G. victoriæ*, tall and handsome, was abundantly covered with its rich, large, crimson flowers, and showed two distinct forms of leaves. On some plants lanceolate, while on others they were quite ovate. Masses of *Euphrasia* and purple *Brachycome*

* It had been considered up to this date that *Ranunculus Muelleri* had been confused with *R. lappaceus* var. *subsericeus* and wrongly recorded for Victoria (Williamson p. 91, Vict. Nat. Sept. 1923, Vol. 40, No. 5). The Committee compiling the Census 1923, accordingly omitted it.

ciliaris were sights, down the slopes, not to be forgotten—quite gardens in themselves. I was surprised to find *Dichondra repens* at the elevation of 4,000 to 5,000 feet. I fear that contact with the hairy stems and fruits of *Bossiæa foliosa*, a shrub that stock will eat, and which was abundant and much handled, was responsible for my dermatitis, so put the note in as a warning to others. The Silver Daisy, *Celmesia* (*Aster*) *longifolia*, is well liked by horses, our guide assured us, but when they first come upon it, and the snow, they are disposed to shy at both. The Tree Violet, *Hymenanthera dentata*, which by an obvious misprint on page 45 of the Census appears as "All but N.E.," is a handsome shrub in the Kiewa Valley from six to eight feet high. On the summit of Mount Bogong it is a dwarf, spinous, divaricate shrub, whose flowers are found on its underneath side, close to the ground.

Collectors do not always make the same records when going over the same ground, even at the same time of the year. Thus, of the twenty-seven species recorded by Dr. Sutton and Mr. Weindorfer, four are not on my list. Of the 80 species Mr. Stirling collected, I did not find 31; while I have 159 native species out of the 221 that I collected not recorded by either of the other collectors from Mount Bogong.

My thanks are due to Mr. A. D. Hardy, who has assisted in adapting the map issued in the Victorian Mining Registrar's report, March, 1886. The additional information recorded will aid in following the narrative, and will be found useful to others visiting the locality.

The *Naturalist* for September, 1923 (vol. xl., p. 88) contains, a short illustrated article, with map, by Mr. H. B. Williamson, F.L.S., who visited the plateau from the eastern side earlier in the year. His map shows more of the surrounding country than the present one.

CRYPTOGAMIA.

The student of bryology will sometimes find a medley of mosses "smothering each other," as the late Mr. Bastow once described some that I sent him. But the question arises: do they, in smothering, destroy life by living upon each other only, or do they not rather contribute to the prolongation of the existence of their life-associates?

Symbiosis is the living together of two organisms in close relation for mutual benefit. It occurs among the mosses, ferns, and some other of the plant-life on Mount Bogong. Some plants appear to receive help to exist among rock crevices, where warmth is essential to maturity in their brief life-season, while later their concern is the retention of that life. Some of the mosses, Hepaticæ, &c., intermingle. Many occur with ferns; some with Droseraceæ, some with Crassulaceæ; others are attached to Cyperaceæ and Juncaceæ, and even with

Compositæ. At least eight of the seventeen species of ferns here listed are found on Mount Bogong in rock crevices only. The Finger Fern, *Polypodium Billardieri*, is much more abundant on Mount Bogong than on the Mount Hotham portion of the Alps. In both localities, in lieu of fern-tree hosts of the lower gullies, rock crevices are chosen. On Bogong it will be found associated with Gnaphalium, Hymenophyllum, and Asplenium. In return for the benefit derived from the mosses, the latter will be found sometimes well coated with fibre wrapped around and well up half the length of the stems and branches. The Filmy and Bristle Ferns, *Hymenophyllum Tunbridgense*, and *H. australe* (*H. javanicum*) and *Trichomanes humile*, are found abundant in communal existence, and are sometimes difficult under these conditions to separate into their respective species, while in close association with them are to be found as many as ten different species of mosses, &c., some of which become so fragmentary on being separated from their hosts as to make determination difficult when immature.

The following mosses, hepatics, and lichens were collected (except No. 4), but the absence of capsules in a number of instances gave my Sydney and Melbourne Herbarium friends much trouble, and made the determinations difficult and incomplete. I found it very interesting to note the plant associations, so subjoin them :—

Muscæ— Names.	Height.	Associations.
1. Acanthocladium extenuatum	5,600	15, *b*, *e*.
2. Amblystegium (Hypnum) fluitans	6,450	Floating in marsh caused by melting snow.
3. Bartramia Halleriana ..	6,000	*b*, *d*, *e*, *i*, *j*.
4. Blindia robusta	6,500	Stirling colr.
5. Bryum, sp.	6,000	*i*.
6. Hookeria hepaticæfolia ..	6,000	16, 17, *c*.
7. Hypnodendron (Hypnum) comosum	6,000	15, *g*.
8. Isothecium gracile	6,000	*a*, *c*, *d*, *f*.
9. Orthorrhynchium Thorpeanum (syn. Phyllogonium elegans)	5,800	*c*, *d*, *f*.
10. Philonotis fertilis	6,000	*i*, Stirling also col.
11. Polytrichum juniperinum	5,500–6,000	18, *a*, *d*, *e*, *g*, *l*, *i*.
12. Psilopilum pyriforme ..	6,000	(rare).
13. Rhizogonium parramattense	5,800	15, *c*, *d*, *f*, *h*.
14. Stereodon cupressiforme ..	5,800	*b*, *c*, *d*, *f*.
15. Sphagnum cymbifolium ..	5,800	1, 7, 13.
15A. Ptychomnion aciculare ..	5,800	*b*.

Hepaticæ—

Names.	Height.	Associations.
16. Mastigobryum novæ-hollandiæ	5,500–6,000	6, *c*, *d*, *e*, *f*, *l*.
17. Meteorium limbatum	.. 5,800	6, *b*, *c*, *d*, *f*.
18. Teboulia hemisphericum	5,500–6,000	11.
19. ? (unidentifiable)	6,000	*m*.

Lichenes—

20. Parmelia physodes	6,000	24.
21. Parmelia physodes, var. pulverata	5,800	*d*.
22. Parmelia conspersa	5,800	9, 16, *c*, *d*, *k*.
23. Thamnolia vernicularis ..	6,450	Between rocky outcrops.
24. Usnea barbata	6,000	On cairn and rocky outcrops, 20.

ASSOCIATES OF THE MOSSES, HEPATICS, AND LICHENS.

Filicales—

a. Asplenium flabellifolium—8, 9, 11.
b. Cystopteris fragilis—1, 3, 14, 17, 15A.
c. Hymenophyllum australe (H. javanicum)—6, 8, 9, 13, 14, 16, 17, 22.
d. Hymenophyllum Tunbridgense—3, 8, 9, 11, 13, 14, 16, 17, 21, 22.
e. Polypodium Billardieri (australe)—1, 3, 11, 16.
f. Trichomanes humile—8, 9, 13, 14, 16, 17.

Cyperaceæ—

g. Carex breviculmis—7, 11.
h. Scirpus antarcticus (S. cartilagineum)—13.
i. Scirpus cernuus (S. riparius)—3, 5, 10, 11.

Juncaceæ—

j. Luzula campestris—3.

Crassulaceæ—

k. Crassula Sieberiana—22.

Compositæ—

l. Gnaphalium Collinum—11, 16.

Droseraceæ—

m. Drosera arcturi—19.

A CONTRIBUTION TO THE FLORA OF MOUNT BOGONG.

REFERENCES.—St., James Stirling; SW, Dr. Sutton and G. Weindorfer; T, Tadgell; *, naturalized aliens; ?, not fully identified; †, doubtful (see notes).

Name.	4,000 ft.	Up to 5,000 ft.	Up to 6,000 ft.	Summit and over 6,000 ft.
Abrotenella nivigena	—	—	St	—
Acacia alpina (†)	—	—	SW	St
A. dealbata	T	—	—	—
A. melanoxylon	T	—	—	—
A. mollissima	T	—	—	—
A. penninervis	SW, T	SW	T	—
A. penninervis, var. falciformis	T	—	—	—
Acæna sanguisorba	T	T	T	T
Aciphylla glacialis	—	—	T	T, St
A. simplicifolia	—	—	T	—
Agrostis venusta	—	—	T	—
A. scabra	—	—	T	T
Arthropodium paniculatum	T	T	—	—
Asperula (oligantha) scoparia	T	—	St	—
A. conferta	—	T	—	—
A. Gunnii	—	—	T	T
Asplenium flabellifolium	—	T	T	—
Astellia alpina	—	T	T	—
Australina Muelleri	T	—	—	—
Azorella cuneifolia	—	St	St	—
Bæckea Gunniana	—	—	St, T	—
Blechnum (Lomaria) penna marina	T	T	T	St, T
B. discolor	T	—	—	—
B. capense	T	—	—	—
B. fluviatile	T	—	—	—
Blennodia alpestris (Erysimum capsellimum)	—	—	—	St
Boronia algida	—	—	—	St
Bossiæa foliosa	—	SW, T	T	—
Brachycome ciliaris	—	T	—	—
B. ciliaris, var. robusta	—	T	T	T
B. nivalis	—	T	St, T	T
B. decipiens	—	T	T	—
B. scapiformis	—	T	T	SW, T
B. stricta	T	T	T	—
B. exilis	—	St	—	—
B. Tadgellii (Tovey & Morris)	—	T	T	—
Brunella vulgaris	T	T	T	—
Bulbine bulbosa	—	T	T	—
Caladenia (nov. sp., Rogers)	—	T	T	—

Name.	4,000 ft.	Up to 5,000 ft.	Up to 6,000 ft.	Summit and over 6,000 ft.
Calamagrostis rudis, var. contracta	T	—	—	—
C. nivalis	—	—	T	T
C. densa	—	—	T	—
C. quadriseta, var. minor ..	—	—	T	—
Callistemon Sieberi (C. salignus, var. Sieberiana)	—	—	St	St
Caltha introloba	—	—	St, T	St, T
Cardamine dictosperma ..	—	T	—	—
C. hirsuta	T	T	T	—
C. hirsuta, var. tenuifolia ..	—	—	T	T
Carduus lanceolatus (*) ..	—	T	—	—
Carex acicularis	—	St	T	—
C. pyrenaica	—	—	—	T
C. Gaudichaudiana	—	—	T	—
C. polyantha	—	T	T	—
C. Buxbaumii	St	St	St	—
C. chlorantha	—	—	T	—
C. alsophila	—	T	—	—
C. breviculmis	—	T	T	—
C. longifolia	—	St	St	—
C. inversa	T	T	T	—
C. appressa	T	T	—	—
C. pseudo-cyperus	—	St	—	—
Carpha alpina	—	—	T	—
Cassinia aculeata	T	—	—	—
Celmesia longifolia	—	—	T	St, T
Cerastium vulgatum (*) ..	—	T	T	—
Chenopodium murale	—	T	—	—
Chiloglottis Gunnii	—	T	T	—
Choretrum lateriflorum ..	T	—	—	—
Claytonia australasica ..	—	T	T	T, St, SW
Clematis aristata	T	T	—	—
Colobanthus subulatus (Benthamianus)	—	—	St	St
C. Billardieri	—	—	T	—
Coprosma hirtella	T	T	—	—
Cotula filicula	T	T	T	T
C. alpina	—	—	—	St
Craspedia Richea	T	T	—	—
C Richea, var. alpina ..	—	—	St, T	T
Crassula Sieberiana	—	T	T	—
C. longifolia, var. latifolia ..	—	—	T	T
Cystopteris fragilis	—	—	T	—
Danthonia penicillata	—	St	St	St
D. penicillata, var. pilosa ..	—	T	—	—
D. penicillata, var. alpina ..	—	T	T	—

Name.	4,000 ft.	Up to 5,000 ft.	Up to 6,000 ft.	Summit and over 6,000 ft.
Danthonia penicillata, var. racemosa	—	T	—	—
D. robusta	St	St	St	—
Daucus brachiatus	T	—	—	—
Daviesa latifolia	T, SW	T, St	—	—
D. ulicina	SW, T	T	—	—
Dianella tasmanica	—	SW, T	T	T
D. tasmanica, var. alba	—	T	T	—
Dichondra repens	T	—	—	—
Dichosciadeum ranunculaceum (Azorella dichopetala) (†)	—	—	St	—
Dicksonia antarctica	T	St	—	—
Didiscus humilis	—	—	T	T
Diplaspis (Huanacea) hydrocotylea	—	St	St, T	St, T
Dipodium punctatum	St 4,500	—	—	—
Drimys aromatica	T	T	T	T
Drosera arcturi	—	—	T	St, T
Dryopteris punctata	T	—	—	—
Epacris Bawbawensis	—	T	T	T
E. microphylla	—	—	T	—
E. serpyllifolia	—	—	St	—
E. petrophylla	—	St	St	—
E. nubigena	—	—	T	—
Epilobium glabellum	T	T	T	—
E. confertifolium	—	—	T	T
Erechtites hispidula	T	T	T	—
E. hispidula, var.	T	—	—	—
E. prenanthoides	—	T	—	—
E. quadridentata	—	T	—	—
Erigeron pappochroma	—	T	T	T
E. pappochroma, var. oblongatus	T	—	T	—
Eriostemon myoporoides	T	T	—	—
Erythrea australis	T	—	—	—
Eucalyptus coriacea, var. alpina	—	T, SW	T	—
E. Sieberiana	T	—	—	—
Euphrasia collina	T	—	—	St, SW
E. collina, var. alpina	—	T	T	T
E. antarctica (†)	—	—	St	St
Ewartia catipes	—	—	T	SW, St, T
Exocarpus nana	—	—	T	—
Galium Gaudichaudii	T	—	—	—
G. aparine (*)	T	—	—	—
Gaultheria hispida	—	T	—	—
Gentiana montana (saxosa) (alpine form)	—	—	T	T, St

Name.	4,000 ft.	Up to 5,000 ft.	Up to 6,000 ft.	Summit and over 6,000 ft.
Geranium dissectum	T	T	T	—
Gleichenia dicarpa	—	St	—	—
Glyceria dives	T	T	T	—
Gnaphalium alpigenum ..	T	T	—	St
G. japonicum	—	T	T	—
G. collinum, var. radicans ..	—	—	T	T
Goodenia hederacea	—	SW, T	T	T
G. hederacea, var. cordifolia ..	—	T	—	—
Grevillea alpina	—	—	St	—
G. australis, var. montana ..	—	—	T	SW, T
G. victoriæ	T	SW	T	—
Halorrhagis micrantha ..	—	—	T	—
H. tetragyna	SW, T	T	T	—
H. teuchroides	—	—	T	—
Helichrysum lepidophyllum (baccharoides)	—	St, T	T	St, T
H. leucopsidium	—	—	SW	—
H. scorpioides	T	T	—	—
H. lucidum	—	T	St	—
H. lucidum, var. alpina ..	—	—	T	T
H. rosmarinifolium	T	T	T	—
H. rosmarinifolium, var. ledifolium	—	—	T	T
H. rosmarinifolium, var. thrysoideum	St	St	—	—
H. semipapposum	T	T	—	—
H. Stirlingii	T	—	—	—
Helipterum anthemoides ..	T	T	St, T	—
H. incanum (alba)	—	—	St, T	T
H. incanum, var. auriceps ..	—	T	T	—
H. incanum, var. auriceps, var. alpina	—	—	St, T	T
Herpolirion novæ-zealandæ ..	—	—	T	—
Hierochloe redolens	T	T	—	—
Histiopteris (Pteris) incisa ..	T	—	—	—
Hovea longifolia	—	T	St, T	T
H. longifolia, var. alba.. ..	—	—	T	—
Hydrocotyle hirta	T	T	—	—
H. laxiflora	T	—	—	—
Hymenanthera dentata (Banksii), var. angustifolia	—	—	T	St, T
Hymenophyllum tunbridgense	—	—	T	T
H. australe	—	—	T	—
Hypochæris radicata (*) ..	T	T	T	T
Hypolæna (Calostrophus) lateriflora..	—	—	St, T	T

Name.	4,000 ft.	Up to 5,000 ft.	Up to 6,000 ft.	Summit and over 6,000 ft.
Juncus communis	T	—	—	—
J. pauciflorus	—	T	—	—
J. plebejus	—	—	T	—
Kunzea Muelleri	—	—	T	St, T
K. peduncularis	T	—	—	—
Lagenophora Billardieri ..	T	T	T	T
Leptorrhynchus squamatus ..	—	—	T	T
Leptospermum lanigerum ..	T	T	T	—
Leucopogon (Styphelia) collinus	—	St	St	—
L. Macraei	—	—	T	—
L. Hookeri	—	—	T	—
Lissanthe (Styphelia) montana	—	—	T	SW, T
Lomandra longifolia	T	—	—	—
L. filiformis	T	—	—	—
Lomatia ilicifolia	SW, T	—	—	—
L. Fraseri	T	—	—	—
L. longifolia	T	—	—	—
Loranthus pendulus	T	—	—	—
Luzula campestris	T	St, T	T	T
Lycopodium clavatum ..	—	—	T	—
L. clavatum, var. fastigiatus ..	—	—	—	T
L. selago	—	—	T	T, St
Mentha laxiflora	T	—	—	—
Microceris scapigera (Forsteri)	T	St, T	T	T
Mimulus moschatus (*) ..	T	—	—	—
Nertera depressa	—	—	T	—
Olearia Frostii	—	T	T	—
O. flavescens	T	T	—	—
O. glandulosa	—	—	St	—
O. subrepandra	—	T	—	—
O. megalophylla	T	T	—	—
O. myrsinoides	T	—	SW	—
O. ramulosa, var. communis ..		—	T	—
O. rosmarinifolia (†)	—	—	St	—
Oreobolus pumilio	—	—	T	—
Oreomyrrhis andicola	T	T	T	T
O. pulvinifica	—	St, T	T	St
Orites lancefolia	—	—	T	St, T
Oxalis corniculata	T	T	T	St
Oxylobium alpestris	—	T	T	St, T
O. ellipticum	T	T	T	—
O. procumbens	—	—	—	SW
Pelargonium australe	T	T	St, T	—
Pentachondra (Trochocarpa) pumila	—	St	T	St, T
Persoonia confertiflora ..	SW	—	—	—

Name.	4,000 ft.	Up to 5,000 ft.	Up to 6,000 ft.	Summit and over 6,000 ft.
Phelabium (Eriostemon) phylicifolium	St	St	St	—
P. podocarpoides (alpinus)	—	—	T	St, T
P. ovatifolium	—	St	St	St
Picris hierachoides (*)	T	T	—	—
Pimelea alpina	—	T	T	St, T, SW
P. axiflora, var. alpina	T	—	T	T, SW
P. ligustrina	—	SW	St	—
P. ligustrina, var. hypericifolia	T	—	T	—
Plantago stellaris (†)	—	—	—	St
P. tasmanica	—	T	T	T
Platylobium formosum	T	T	—	—
Pleurandropsis (Eriostemon) trymalioides	—	T	T	St
Pleurosorus (Grammitis) rutifolius	—	—	—	St
Poa annua (*)	—	—	T	—
P. cæspitosa	—	—	St, T	T
P. cæspitosa, var. alpina	T	—	—	—
P. cæspitosa, var. latifolium	—	—	T	—
Podocarpus alpina	—	T	T	—
Podolepis acuminata	—	—	St	—
P. longipedata, var. robusta	—	—	T	T
Polygonum aviculare (*)	T	T	T	—
Polypodium Billardieri	—	—	T	T
Polystichum aculeatum	T	T	T	T
Poranthera microphylla	T	T	T	St
Prasophyllum brevilabre	T	—	—	—
P. Suttonii	—	—	T	T
P. Tadgellianum (Rogers)	—	—	T	T
Prostanthera cuneata	—	T	T, St	T
P. lasianthos	T	T	—	—
P. lasianthos, var.	—	T	—	—
P. incisa (5,500) (?)	—	—	T	—
P. rotundifolia	—	—	—	T
Pteridium aquilinum	T	—	—	—
Pultenæa juniperina, var. planifolia	T	—	—	—
Ranunculus anemoneus (†)	—	—	—	St
R. hirtus	T	—	—	—
R. Gunnianus	—	—	T	T
R. lappaceus	T	T	T	T
R. Millanii	—	—	—	St
R. Muellerii	—	—	—	T
Richea Gunnii	St	St	St, T	T
Rubus parvifolius	T	T	T	—

Name.	4,000 ft.	Up to 5,000 ft.	Up to 6,000 ft.	Summit and over 6,000 ft.
Rumex acetosella (*)	T	T	T	T
R. Brownii	—	—	T	—
Scaevola Hookeri	—	—	T	—
Schizeilema fragoseum (Azorella Muelleri)	—	St	St, T	St, T
Scirpus cernuus	—	—	T	—
S. inundatus	—	—	T	—
S. setaceus	T	T	—	—
S. cartilagineus, var. alpina ..	—	—	T	—
Scleranthus biflorus	—	—	T	T
S. mniaroides	—	—	T	T
Senecio dryadeus (australis) ..	T	—	St, T	—
S. velleioides	—	—	T	—
S. pectinatus	—	—	St, T	T
S. vagus	T	—	—	—
S. odoratus	—	T	T	—
S. lautus	—	—	T	—
Shœnus apogon	—	—	T	—
Spergularia rubra	—	—	T	—
Stackhousia linarifolia ..	T	—	T	—
S. pulvinaris	—	—	—	St
Stellaria pungens	T	T	T	T
Stylidium (Candollea) serrulata	—	SW	St	—
S. graminifolium	T	T	St, T	T
S. graminifolium, var. alba ..	—	—	T	—
Taraxacum officinale (*) ..	T	T	T	—
Thelymitra venosa	—	—	T	—
T. grandiflora	T	—	—	—
Thysanotus tuberosus ..	T	—	—	—
Tieghemopanax (Panax) sambucifolius	T	—	—	—
T. (Panax) sambucifolius, var. angustifolia	T	—	—	—
Trichomanes humile	—	—	T	—
Trifolium pratense (* ?) ..	T	—	—	—
T. repens (*)	T	T	T	—
Trisetum subspicatum ..	—	—	T	T
Tristania laurina (?)	T	—	—	—
Uncinia compacta	—	—	T	T
Urtica incisa	T	—	T	—
Veronica Derwentia	SW, T	T	St	—
V. serpyllifolia	—	—	T	T
V. arvensis (*)	T	—	—	—
Viola betonicifolia	T	T	T	—
V. betonicifolia, var. alba ..	—	T	—	—
V. caleyana	—	—	St	—

Name.	4,000 ft.	Up to 5,000 ft.	Up to 6,000 ft.	Summit and over 6,000 ft.
V. hederacea	T	St, T	—	—
Wahlenbergia gracilis	T	St, T	T	T

The plants included in the above list are classified according to the systematic arrangement adopted in the "Census of the Plants of Victoria" by the F.N. Club of Victoria, 1923.

Families.	Species.	Varieties.	Aliens.
Araliaceæ	1	1	—
Campanulaceæ	1	—	—
Caryophyllaceæ	6	—	1
Chenopodinaceæ	1	—	—
Compositæ	50	10	4
Convolvulaceæ	1	—	—
Crassulaceæ	1	—	—
Cruciferæ	3	1	—
Cyperaceæ	20	—	—
Droseraceæ	1	—	—
Epacridaceæ	10	—	—
Ericaceæ	1	—	—
Euphorbiaceæ	1	—	—
Filicales	17	—	—
Gentianaceæ	2	—	—
Geraniaceæ	2	—	—
Goodeniaceæ	2	1	—
Gramineæ	12	5	1
Halorrhagidaceæ	3	—	—
Juncaceæ	4	—	—
Labiatæ	5	1	—
Leguminosæ	13	2	2
Liliaceæ	8	1	—
Loranthaceæ	1	—	—
Lycopodiaceæ	2	1	—
Myrtaceæ	8	—	—
Œnotheraceæ	2	1	—
Orchidaceæ	8	—	—
Oxalidaceæ	1	—	—
Plantaginaceæ	2	—	—
Polygoniaceæ	1	—	2
Portulaceæ	1	—	—
Proteaceæ	8	—	—
Ranunculaceæ	8	—	—
Restionaceæ	1	—	—
Rosaceæ	2	—	—
Rubiaceæ	6	—	1
Rutaceæ	6	—	—
Santalaceæ	2	—	—

Families.	Species.	Varieties.	Aliens.
Scrophulariaceæ	4 ..	1 ..	2
Stackhousiaceæ	2 ..	— ..	—
Stylidiaceæ	2 ..	1 ..	—
Taxaceæ	1 ..	— ..	—
Thymeleaceæ	3 ..	1 ..	—
Umbelliferæ	13 ..	— ..	—
Urticaceæ	2 ..	— ..	—
Violaceæ	4 ..	1 ..	—
Winteraceæ	1 ..	— ..	—
Species		256	
Varieties		28	
Aliens		13	
Mosses, Hepatics, Lichens, additional		24	

ALFRED R. C. SELWYN.—One hundred years ago on 28th July last was born, in Somerset, England, the man who made Victorian geology, or, rather, put Victorian geology on such a sure foundation that few of his conclusions have been upset. He was head of the Victorian Geological Survey from 1852 to 1869, during which period he and his staff succeeded in geologically mapping a large portion of the State. The maps produced were models of their kind, and at the time were not excelled by those of any other country. Unfortunately for Victoria, one of those "cutting downs" of governmental expenditure which happen now and again led to the departure of Mr. Selwyn to Canada, where he carried on a similar survey until his retirement in 1894, honoured by scientific societies all over the world. He died in Vancouver in 1902, at the age of 78, respected by all who knew him.

THE KEA, *Nestor notabilis.*—This fine New Zealand parrot has the reputation of killing sheep by alighting on their backs and digging into the carcass for their kidney fat. According to an article in the July (1924) *Emu*, by Mr. J. Moncrieff, on "The Birds of the West Coast of New Zealand," this practice has never been witnessed, and, like many other natural history stories, requires to be proved. At any rate, it is believed by the authorities, and at the request of the sheep-farmers a bonus of six shillings per beak is being paid as a means of getting rid of the poor birds. As the bird is a large one, it affords a good and profitable target to the shooter. The bird is a quaint one and plays many tricks on confiding tourists to the higher regions it frequents, such as carrying boots out of tents, &c. Before extirpating this fine bird the matter should be definitely decided by experiment or by careful watching.

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The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria

Published 4th September, 1924

Hon. Editor: F. G. A. BARNARD, Esq.

The Author of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS--ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING.

MONDAY EVENING, 8th SEPTEMBER.

1. Correspondence and Reports.
2. Election of Members.

	PROPOSER.	SECONDER.
AS ORDINARY MEMBER— Miss Wilson, 92 Park St., South Yarra.	Mr. C. Oke.	Mr. J. Searle.
AS ASSOCIATE MEMBER— Mr. A. Wade, Ridley College, Parkville.	Mr. J. Searle.	Mr. C. Oke.

3. Nominations for Membership.
4. General Business.
5. Remarks by Exhibitors relative to their Specimens.
   Ten minutes' adjournment for discussion of Exhibits.
6. Reading of Paper and Discussion thereon.
   By Dr. W. MacGillivray (Broken Hill).—"An Excursion in South-Western Queensland" (continued)
   The committee will be pleased to receive promises of papers for future meetings.
7. Reading of Natural History Notes.
   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same, that he may arrange for their bringing them before the meeting; such notices should, however, be brief.
8. Exhibition of Specimens and Conversazione.
   Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Club year ended on 30th April last. Any subscriptions overdue should be forwarded to the Hon. Treasurer at once.

Subscriptions for the year 1924-5 became due on 1st May.

SPECIAL NOTICE.—The attention of members is directed to item 8 of business paper. Notices of exhibits should, if possible, be type-written.

EXHIBITION OF WILD-FLOWERS.

Members are desired to note that the above Exhibition will be held in the Melbourne Town Hall, on TUESDAY, 21st OCTOBER, and to communicate with friends in the country with regard to exhibits.

LIBRARY.

The Hon. Librarian desires that all books and magazines belonging to the Club be returned at the September meeting, to facilitate the re-arranging of the Library.

The Victorian Naturalist

Vol. XLI.—No. 5. SEPTEMBER 4, 1924, No. 489.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall, on Monday, 11th August, 1924.

The President, Mr. J. Searle, occupied the chair, and about fifty-five members and visitors were present

ELECTION OF MEMBERS.

On a ballot being taken, Mr. and Mrs. R. W. Wilkinson, Alma Road, East St. Kilda; and Mr. A. J. Day, 199 Toorak Road, South Yarra, were duly elected ordinary members of the Club.

GENERAL BUSINESS.

The President announced that the Annual Exhibition of wild-flowers would be held in the Melbourne Town Hall on Tuesday, 21st October, and urged members to make the exhibition a success. It had been decided to give half the net proceeds to the Victorian Bush Nursing Association.

Mr. H. B. Williamson, F.L.S., referred to the quantities of wild-flowers exposed for sale in the streets and florists' shops, and, while admiring the taste for indigenous flowers which has grown considerably during the last year or two, deprecated the collection of these flowers and their sale for monetary gain, as it would undoubtedly hasten their extirmination. He urged members to obtain what evidence they could regarding the question in view of future discussion.

Mr. C. Daley, F.L.S., and Mr. F. G. A. Barnard also spoke on the subject.

PAPERS READ.

1. By Mr. F. Pitcher, entitled, "In the Strathbogie Ranges."

The author gave some interesting notes of an autumn visit to the Strathbogie Ranges, which he visited from the vicinity of Lima. The country traversed was principally granitic, and contained many interesting spots from a botanical point of view, ferns of many species being plentiful, while in the early summer wild-flowers should be very plentiful.

The author exhibited a fine series of specimens in illustration of his remarks.

Messrs. H. B. Williamson, F.L.S., and G. Coghill also referred to the interesting nature of the district.

2. By Dr. W. Macgillivray (Broken Hill), entitled, "An Excursion in South-western Queensland."

In the absence of the author, the first portion of the paper was read by Mr. F. E. Wilson. The author gave some account of the birds and vegetation seen during a motor-trip from Broken Hill, N.S.W., to Hungerford, and then to the nearest rail-head in Queensland. The paper gave a detailed description of the natural history of the trip.

Mr. H. B. Williamson, F.L.S., remarked on the interest of the author's observations, and said that though the trees were different, a large proportion of the smaller plants mentioned were to be found in Victoria, especially in the north-west.

Mr. C. Daley, F.L.S., remarked on the similarity of the bird-fauna to that of our north-western area.

NATURAL HISTORY NOTE.

Mr. L. Thorn drew attention to his exhibit of three species of the Silvery Wattle-moths, and gave some account of their life histories.

EXHIBITS.

By Mr. F. G. A. Barnard.—Flowering branches of the Long-podded Wattle, *Acacia elongata*, of New South Wales, grown at Kew.

By Mr. G. Coghill.—Flowers of native shrubs, etc., grown at Canterbury:—Rosemary Grevillea, *Grevillea rosmarinifolia;* Mountain Grevillea, *G. alpina;* Olive Grevillea, *G. oleoides;* Bushy Heath-myrtle, *Thryptomene Mitchelliana;* Fringed Heath-myrtle, *Micromyrtus ciliatus;* and Long-leaf Wax-flower, *Eriostemon myoporoides*, with Purple Coral-pea, *Hardenbergia monophylla* growing over it.

By Mr. C. Daley, F.L.S.—Flowers of Bushy-Heath-myrtle, *Thryptomene Mitchelliana*, and Fringed Heath-myrtle, *Micromyrtus ciliatus*, grown at Caulfield; Steatite, from Black Ranges, near Stawell.

By Mr. J. E. Dixon.—Coleoptera collected at Ferntree Gully and Emerald during July.

By Mr. L. Hodgson.—Flowers of Varnish Wattle, *Acacia verniciflua;* Mudgee Wattle, *A. spectabilis;* Mountain Grevillea, *Grevillea alpina;* Fern-leaf Grevillea, *G. asplenifolia;* Fuchsia Heath, *Epacris longiflora;* and Fringed Heath-myrtle, *Micromyrtus ciliatus*, grown at Canterbury.

By Mr. V. Miller.—Flowers of Dwarf Greenhood (orchid), *Pterostylis nana*, from Cheltenham Park.

By Mr. C. Oke.—Rare beetles—*Carenum scaritoides* (m. and f.), from Eltham, rare so near Melbourne; and *Pheidoliphila granulata*, Lea, from Sunshine, only the second specimen of this beetle that has been found.

By Mr. F. Pitcher.—Dried plants, etc., collected at Lima East, in illustration of paper:—Foliage of Blue Gum, *Eucalyptus globulus*, young foliage, 4 in. x 6 in.; adult foliage, over 20 in. long, one leaf being 25½ in. long and 3½ in. wide; Frond of Bracken Fern, 7 ft. 3 in. in length; Fronds of Maiden-hair Fern, Rock Fern and Sickle Fern, each 18 in. long; Delicate Rue Fern, *Anogramma (Grammitis) leptophylla;* Orchid, Striped Greenhood, *Pterostylis reflexa;* and other plants found in bloom.

By Mr. W. H. A. Roger.—Portion of pod of Climbing Bean, *Entanda scandens*, also a bean, from scrub near Cooktown, North Queensland.

By Mr. L. Thorn.—Specimens of Silvery Wattle-moths:—*Thalaina clara, T. inscripta,* and *T. punctilinea,* with pupa cases, etc.

After the usual conversazione, the meeting closed.

The Tasmanian Field Naturalists' Club.—For many years this club has made a feature of its "Easter Camps," the twenty-first of which was held this year at Marion Bay, Forestier's Peninsula. These camps are usually well attended, no less than forty members and friends taking part this year. An illustrated report of the outing has been issued by the club, which gives brief details of the activities of different sections of the party, as well as a general account, mainly historical, by Mr. Clive Lord, F.L.S.

"The Lyre Birds of Mount Buffalo."—This is an attractive booklet of about a dozen pages, containing seven ½-plate reproductions in sepia of photographs of Lyre Birds, their nests and young, taken at Mount Buffalo by "Guide Alice," who also supplies short notes explanatory of the pictures. Mr. Charles Barrett, C.M.Z.S., has written an appreciative introduction, which serves to introduce the reader to "Guide Alice," through whose patience and perseverance the almost unique pictures were secured. The snap of the male bird, with his tail-feathers proudly displayed, is very fine, and was worth waiting for. The booklet is priced at half-a-crown, and will form a nice souvenir to post to friends at home and abroad.

THE AQUATIC PROTOZOA OF THE MELBOURNE DISTRICT.

PART II.

BY JOHN STICKLAND.

(Read before the Field Naturalists' Club of Victoria, 14th July, 1924.)

In the first part of this paper, which appeared in the *Victorian Naturalist* for August, 1923 (Vol. XL, p. 65), it may be remembered that a brief sketch of the characteristics of the organisms constituting the phylum Protozoa was given, including a little about their physiology, after which the lowest group, Class 1, Sarcodina, received attention. A distinguishing feature of the forms included in that class was their power of extending and withdrawing portions of their cytoplasm in the shape of blunt or thread-like processes—the pseudopodia—by means of which they are able to travel slowly and also capture their food.

In this paper I propose to deal with Class 2, the Mastigophora. The organisms belonging to this class, with very few exceptions, do not extend pseudopodia, but in their stead possess one or more whip-like organellæ, known as flagella, at what may be regarded as the anterior end of the animal in most cases. It is in connection with these flagellate forms principally that botanists and zoologists join issue.

Speaking of flagellates, Professor G. S. West, in his "Algæ," vol. 1, page 162, says, "It is well known that among the heterogeneous assemblage of forms in the group, the distinction between animal and vegetable organisms entirely breaks down," and, although he claims certain forms as undoubted plants, equally eminent zoologists, while admitting their plant-like nature, consider that they cannot be omitted from the Protozoa.

The sedentary forms use their flagella for procuring food by creating a disturbance in the water which brings the food particles into contact with them, while the free swimmers use them for the purpose of locomotion also, as mentioned in the previous paper. According to Verworn, the flagella of Flagellates, like the cilia of the Infusoria, are possessed of the power of contracting, like the fibrillæ of muscle fibres in the higher animals, hence their capacity to move. The flagellum originates at or near the nucleus of the animal,

often from a special particle known as the "blepharoplast," hence it is more than a mere prolongation of the animal's cytoplasm. A central thread or axial filament runs through the entire length of the flagellum, which thus bears some resemblance to the axopodia of the Heliozoa. The movement of the flagellum seems to be extremely effective in producing locomotion by the animal of which it forms part, as it is frequently noticeable that the mere tip is waving even when rapid swimming is induced.

As is frequently the case in nature, the transition from a lower to a higher type is bridged over by intermediate forms, so here the gap between the pseudopodia bearing Sarcodina and the flagellate Mastigophora is filled by some creatures which are capable of extending pseudopodia although furnished with a flagellum. Such an animal is Mastigamœba, which, although flagellate, ingests its food after the manner of an Amœba. Animals of this type are very rare if my experience is any criterion.

Professor Minchin, whose classification I am adopting, divides the Mastigophora into three sub-classes, Flagellata, Dinoflagellata, and Cystoflagellata. The first-mentioned sub-class contains most of the organisms to which reference will be made. They are not of large size even for Protozoa, some indeed are extremely minute, as will be seen. They are in some cases free swimming, in others sedentary; some have one flagellum only, others have two or more; some are solitary, others colonial in their habit. Dinoflagellates will receive attention later, but the Cystoflagellates, of which the marine luminous form, Noctiluca, is a type, have never been represented in my gatherings and will therefore be passed over.

The sub-class, Flagellata, is divisible into several orders. Order I, known as the Pantostomina, contains animals having no definite mouth opening. The Mastigamœba before referred to belongs to this category. As I am uncertain of the identity of the only creature, apparently of this type, which I have taken, I pass on to Order II, Protomonadina. This order contains some parasitic forms, such as the dreaded Trypanosomes, which are outside the scope of my paper. The Protomonads ingest their food at the base of the flagellum; those with which we have to do are holozoic as far as their nutrition is concerned.

Of those to be had near Melbourne we may mention *Spongomonas intestinalis*, Cienk. This is a social animal,

biflagellate, of the "isomastigote" type, the flagella being of equal length. It is extremely small, measuring only about 8 micra in length. The individuals comprising the colony are embedded in the surface of a thread-like zoothecium, often considerably branched and of a brown colour. They are oval in shape and appear like dots in the surface of their domicile. The flagella, being always in motion, are very hard to see, their presence being, however, demonstrated by the commotion among particles in the surrounding water. The colony may contain hundreds of individuals and are of decidedly rare occurrence near Melbourne. I have taken this form only in the Kilby Lagoon, at East Kew, and the Botanic Gardens.

Another animal somewhat similar in shape is *Anthophysa vegetans*, Müller, which is also colonial in habit. It is another extremely small creature, being from 5 to 10 micra in length, and is "paramastigote," that is, possessing two flagella of unequal length. The colonies in this case are oval or spherical in shape, containing numerous individuals closely attached to one another and to the end of a frequently somewhat roughly-constructed peduncle of a dark brown colour, often branched, constructed of excreted matter. It is quite a common occurrence to come across the colonies detached from their peduncle rolling through the water after the manner of Volvox. *Rhipidodendron huxleyi*, S.K., is another minute isomastigote animal, about 12 micra in length, forming colonies inhabiting branching zoothecia, of a dark brown colour, very granular in appearance. The various branches of the zoothecium consist of four thread-like structures placed side by side, the extreme ends of which contain the tiny builders. This form can be obtained in most ponds near Melbourne.

A very interesting and beautiful little animal is *Stylobryon petiolatum*, Duj. It forms fixed colonies of ten or twelve zooids attached to some medium of support by a common rigid stalk or peduncle. The animal secretes a transparent vase-shaped lorica, one individual occupying each domicile. Each lorica, after the first, is attached by a pedicil to the inner surface of the one below, the animal itself being also supported by a pedicil fixed to the bottom of its lorica. It has two flagella of unequal length. The lorica measures about 25 micra in length. Stylobryon is a decidedly rare form, and has been recorded only from the Black Pool at Heidelberg and a small pond at Bulleen. Dendromonas, St., forms

a tree-like colony and is destitute of a lorica. It also has two unequal flagella, which sometimes appear as if proceeding from the side of the animal, which measures from 8 to 10 micra in length.

The Family Choanoflagellidæ contains a number of remarkable forms of extremely minute size. They are monomastigote and characterised by the presence of a transparent cup-shaped collar enclosing the area around the flagellum. They are sessile in some genera and stalked in others, some of the latter forming colonies containing a considerable number of individuals attached to a common centre. In all the flagellates previously referred to the flagellum is of the "tractellum" type, that is, it draws the animal to which it belongs after it, as it were; in the case of the Choanoflagellates, however, when swimming freely, it is used as a "pulsellum," that is, it impels the animal before it after the manner of a single oar used in sculling a boat from the stern.

A form which I take to be *Monosiga consociatum*, S.K., is sessile and frequently found in large numbers closely packed side by side, completely encasing the supporting filament, which not infrequently is the stalk of a vorticellid. In *Codosiga botrytes*, Ehr., we have a similar animal forming a stalked colony. These Choanoflagellates are only 6 to 15 micra in length and the collar so delicate that it is extremely difficult indeed to see it satisfactorily; at its outward edge it generally appears as two lines only, one on each side of the flagellum.

It is remarkable that practically identical collared cells occur in sponges and indicate a close relationship between the Protozoa and the Porifera. The Choanoflagellates are sometimes designated Craspemonads.

The third order—Polymastigina—consists of animals having three or more flagella. Of these I have found no certain representative. They are mostly parasitic.

Order IV is known as Euglenoidena and is well represented in the pools near Melbourne. The animals comprising it have a well-defined mouth opening and œsophagus at the base of the flagellum. *Euglena viridis*, Ehr., is perhaps one of the best known. It is spindle-shaped and monomastigote, the flagellum is possessed of an axial filament which is hard to make out. The possession of green chromatophores stamps it as being holophytic in its manner of nutrition. It has a stigma, or eye spot, red in colour, containing numerous

pigment granules of hæmatochrome. Euglena is extremely changeable in shape—or "metabolic," thus a part of the creature, say near the anterior end, will become thicker than the remainder of the animal, the thickness will travel along the length of the animal, disappearing at the posterior end. Englenas are decidedly positively phototactic, possibly through the possession of the stigma referred to, which is considered to be sensitive to light. A good demonstration of this was seen recently when passing along Alexandra Avenue one bright Saturday afternoon, when a red scum-like material floating on the surface of the water in the rocky fountain pool near the Queen's statue was noted. On returning a couple of hours later when the light was less intense not a sign of this red substance was to be seen. An examination later under the microscope showed it to consist of innumerable red Euglenas, possibly *E. sanguinea* of Ehrenberg, many of which were of the round form Euglenas assume when resting. *E. spirogyra*, Ehr., is a larger animal than *E. viridis*, and not nearly so common, and is characterised by well-defined spiral markings extending over its whole length. A large and extremely sluggish form occasionally met with I take to be *E. deses*, while *E. acus* is extremely thin and needle-like.

Amblyophis, Ehr., differs from the Euglenas by being blunt and rounded at the posterior end. My experience as a collector indicates that it is very rare.

Phacus, Nitzsch, is another genus belonging to the same order. There are several species, and all are beautiful objects. Their thin film-like substance and slowly-revolving motion when swimming, suggest the falling leaf, the contained chloroplasts add to the similarity by reason of their greenness. *P. triquetra*, Ehr., is the commonest; it is oval in shape and has a short spur-like extension at its hinder end, while *P. longicaudus*, Ehr., as its name indicates, is possessed of a long tail-like appendage. It is found in two forms, one quite flat and the other twisted into a spiral. *P. pyrum*, Ehr., has well-defined spiral ridges extending across its whole length; it is, however, rarely taken. The members of this genus have a prominent stigma. The genus Trachelomonas, Ehr., is very well represented, occurring in most of the ponds and ornamental lakes in the vicinity of Melbourne. The constituents of this genus form tests of orange or red colour, said to be of a calcareous nature. The animal does not fill

its test, while from an opening at one end projects a single flagellum. The green colour of the contained chloroplast can be noticed through the test. A very common member of the genus is *T. hispida*, St. It is oval or sub-spherical in shape and generally devoid of any collar at the opening. The test is covered all over with knobs. Its length is 25 to 30 micra. *T. armata*, Ehr., is not so common. It is characterised by the presence of several long curved spines at the posterior end of the test. A species having a cylindrical test, sometimes somewhat pointed at the posterior end and with an elongated neck-like extension round the flagellum, bears an exact resemblance to a floating bottle.

Another family, Astasiidæ, belonging to the same order, furnishes us with an interesting creature, *Astasia tricophora*, Ehr. It is shaped like an elongated pear, with a flagellum of considerable length, of which it moves little more than the tip. Being destitute of any chromatophores, it is colourless. *Anisonema grande*, St., presents some features which are very distinct from those of others of the same family. It is "heteromastigote," that is, possessing two flagella of very different kinds, the one being of the ordinary tractellum type, while the other trails behind when the animal swims. It is able to attach itself instantly by the extreme end of this trailer, and, when thus anchored, darts about in any direction as far as the flagellum will allow.

Order V is called Chromomonadina, the members of which contain brown-coloured chromatophores and are destitute of any œsophagus. One of the most interesting forms in this group is Dinobryon, Ehr., of which several species are described. The one generally taken here is *D. sertularia*, Ehr. It bears a considerable general resemblance to Stylobryon referred to earlier, but differs in important respects. It inhabits a vase-shaped lorica which is not pedicillate, but each one—of course excepting the first or original one in the colony—is perched on the edge of the one below. Two may be attached to the one supporting lorica. Unlike Stylobryon, which is a fixed form, the whole Dinobryon colony, which may consist of twenty or more individuals, is free swimming, and presents the appearance of a spray of flowers.

Mallomonas sp., although belonging to the same order, is a very distinct form. It possesses no lorica, but, in addition to a flagellum, is completely surrounded with stiff setose appendages suggestive of an infusorian. It has a habit of darting

quite suddenly from place to place. It is extremely minute, measuring only 25 micra in length. *Synura uvella*, Ehr., forms colonies, the individuals in which may number thirty or forty. The colony is spherical in form, the animals being connected to a common centre, and rolls through the water after the fashion of the well-known Volvox. The exterior of each creature is covered with short spines. *Uvella virescens*, Ehr., is a very similar form, but is destitute of the spinous cuticle of Synura; by some it is regarded as simply a variety of the latter. Both Synura and Uvella are biflagellate. *Uroglena volvox*, Ehr., another free swimming colonial animal, is rather rare. Unlike Synura, the zooids are not connected together, but are embedded in the outer part of a gelatinous sphere.

Order VI, Phytomonadina, forms the great battle-ground for zoologists and botanists. The chloroplasts contained by the constituent animals indicate that they are decidedly holophytic. The enclosing envelope is of cellulose. Family 2 of the order, Chlamydomonadidæ, contains some interesting genera. Chlamydomonas, Ehr., is an extremely minute biflagellate form, but is at times found in such countless myriads as to give large bodies of water a decidedly green appearance. I have found it frequently in pans containing drinking water for the fowls.

A very beautiful little organism is *Sphaerella pluvialis*, Flotow. It consists of a hyaline sub-spherical envelope of cellulose, within which, but separated from it by a small space, is the cell proper, which is connected with the cell wall by numerous strands of protoplasm. A conical projection of the inner cell reaches the cell wall in one part and from it project two flagella. On one occasion when by chance examining some rain water which had collected in an old iron pot placed on the fowl-house roof to get it out of the way, I discovered it to be swarming with most beautiful specimens of this form. In this position it could only have developed by being wind borne. This organism was formerly widely known as *Protococcus pluvialis*. A red form is known as Hæmatococcus.

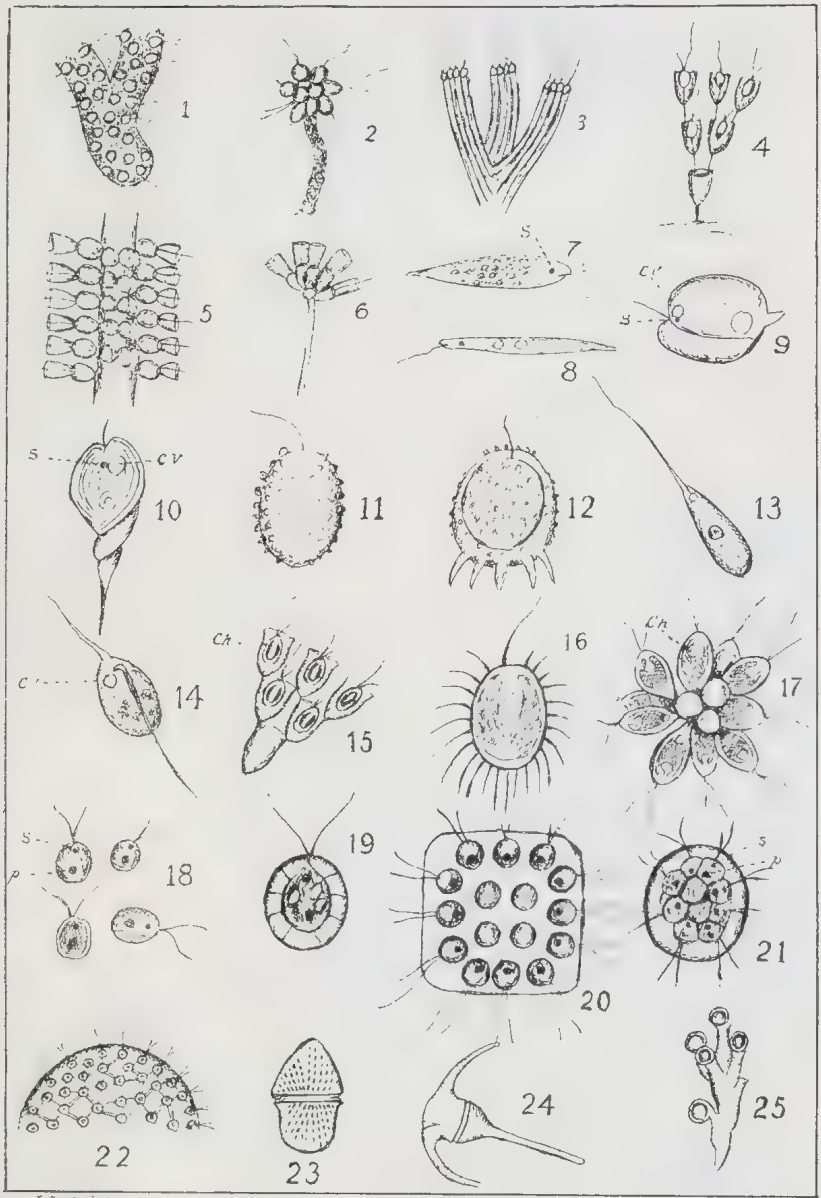
Family IV, Volvocidæ, contains many well-known forms. *Gonium pectorale*, Müller, consists of a colony of sixteen cells, placed in one plane, with the flagella projecting outward. The cells are enclosed within a gelatinous envelope. *Pandorina morum*, Müll., is a colony of cells sometimes num-

bering thirty-two, in a compact mass of spherical or oval form, surrounded by a very transparent envelope, each cell possessing two flagella and an eye spot. The best known and most important genus in this order is doubtless Volvox. It is also the most beautiful. A number of these rolling about in a drop of water when viewed under a low power of the microscope never fails to excite admiration. In shape the Volvox colony is generally spherical, and the gelatinous substance forming its exterior is perfectly transparent. Imbedded in this investment are many green cells, not in a compact mass as in Pandorina, but separated from one another by some little space which varies in different species. *Volvox globator*, Ehr., is a common and cosmopolitan form, and may be regarded as belonging to the plankton. The cells, which are said to number as many as twenty thousand in one colony, are irregular in shape and measure only a few micra in diameter. Each cell is furnished with an eye spot, one or more contractile vacuoles and two similar flagella. Connecting these cells with one another are somewhat irregular strands of protoplasm, often of a branching type. Whereas in Pandorina each cell is capable of reproducing a new colony, it is not so in Volvox, in which this capacity is limited to a few special cells known as parthenogonidia, which reproduce new colonies asexually. Several of these daughter colonies are generally to be seen within adult forms. They are set free to assume independent existence by the rupture of the parental investment. The vast majority of the cells forming the colony are sterile. A sexual method of reproduction may be noted in some colonies. When this takes place a few cells divide and form antherozoids, or sperm cells, and others also few in number, become oospheres. After fertilisation the last-mentioned form oospores, which in *V. globator* are stellate. Self-fertilisation takes place in *V. globator*, which is monœcious. *V. aureus*, also known as *V. minor*, is smaller than *V. globator*, and the cells in the colony are not nearly so numerous, being only about two thousand in number. They are round in shape and considerably more widely separated. This, together with the character of the connecting protoplasmic strands, render the identification of *V. aureus* an easy matter. The protoplasmic strands in this case run in practically straight lines from cell to cell and are frequently double and never branch. The oospore is round, not stellate. A form in which the cells are round, but not connected by protoplasmic strands, has been named *V.*

tertius by Meyer. I recently took a specimen answering this description, but, until verifying its identification, cannot claim it with certainty. Microscopical members might be on the look-out for this form. West, in his "Algæ," mentions a species of Volvox—*V. Rousselletii*—as consisting of fifty thousand cells. Volvox may be obtained in the Botanic Garden lake all the year round.

Sub-class 11, Dinoflagellata, is divided into two orders, of which the second—the Dinifera—only interest us now. The organisms constituting this order are characterised by the possession of two flagella, one placed in a longitudinal groove situated in the ventral surface, the other in a transverse groove which nearly encircles the animal. The flagellum in the longitudinal groove trails behind the creature when it swims. The order Dinifera is subdivided into two families, the first being known as the Gymnodinidæ, which is represented in our local ponds by *Gymnodinium fuscum*, Ehr. This animal resembles a diamond in shape with one of the long corners rounded off. Its colour, as its name indicates, is a reddish-brown, with rod-like markings radiating from the centre. As is the case throughout the family, it is destitute of the well-developed cuirass which is a marked feature of many Dinoflagellates. I have not found it to be very widely distributed, but it may be had practically all the year round in the pond in the Horticultural Gardens.

The second family of the Dinifera, the Peredinidæ, contains some interesting genera which, however, have not supplied many examples. The members of this family are entirely enclosed within a firm envelope or cuirass, consisting of a number of plates of cellulose, or some modification of the same; the joints where these plates meet are very distinct. The Peridinium generally found here is spherical in shape, and I have not determined its species, very probably it is *P. tabulatum*. An animal very distinct from most others of the family is *Ceratium tripos*, Müll. Here we find the cuirass extended into three long horns, one at one end and two recurved ones at the opposite end, which give it a singular appearance, the greater part of the animal consisting of these "horns." Ceratium may be found



Stigma (eye spot); C.V. Contractile vacuole; Ch. Chromatophore; P. Pyrenoid

Protozoa illustrating Class 2, Mastigophora.

in both fresh and salt water. In the former habitat it is very rare, the only example I have taken under such conditions was obtained in the lily pond in Queen's Park, Moonee Ponds. At a recent excursion to Frankston, however, a large number was obtained in the sea.

The consideration of Class IV, the Infusoria or ciliate forms, must be reserved for some future occasion.

EXPLANATION OF PLATE.

1.—Spongomonas intestinalis.
2.—Anthophysa vegetans.
3.—Rhipidodendron huxleyi.
4.—Stylobryon petiolatum.
5.—Monosiga ?consociatum. A colony.
6.—Codosiga ?botrytes.
7.—Euglena viridis.
8.—E. acus.
9.—Phacus triqueter.
10.—P. longicaudus, spiral form.
11.—Trachelomonas hispida.
12.—T. armata.
13.—Astasia tricophora.
14.—Anisonema grande.
15.—Dinobryon sertularia.
16.—Mallomonas sp.
17.—Uvella viresceus.
18.—Chlamydomonas sp.
19.—Sphaerella pluvialis.
20.—Gonium pectorale.
21.—Pandorina morum.
22.—Volvox aureus, showing characters of protoplasmic strands connecting cells.
23.—Gymnodinium fuscum.
24.—Ceratium tripos.
25.—Colony of Dinobryon encysted.

Bird Notes.—The month of July must be regarded in the bird world as the beginning of spring, particularly this year, when the rainfall has been the lowest for a considerable number of years. The prevalence of fine mild days caused many birds to commence nesting earlier than usual, and even the cuckoos arrived in the Ashburton district fully a month earlier than in previous years. On July 13 the nest of a Yellow-tailed Tit, *Acanthiza chrysorrhoa*, with three eggs, was found in an acacia bush at Ashburton, while in a tall eucalypt in the vicinity a pair of White-backed Magpies, *Gymnorhina leuconota*, was still building a nest which they had commenced during the latter part of June. It is noticeable with early-breeding birds that a longer period is required for nest building than with those that nest later in the season. Both the Wattle-Bird, *Acanthochaera carunculata*, and Swift Parrot, *Euphema discolor*, annually visit the box trees near Melbourne during the winter months. While a few of the former remain to nest locally, the parrots retire further inland as the nesting season approaches. A notable record for this year is the early appearance of the Bronze, *Chalcococyx plagosus* and Fan-tailed, *Cacomantis flabelliformis*, Cuckoos; both birds were seen at Ashburton on July 20, and the latter bird has been seen or heard every week since. It is practically certain the Fan-tailed Cuckoo remained in the northern parts of Victoria during the winter, as a bird was noted in the Caulfield Park on May 11, and a week later another one was seen in the Mooroolbark district.—D. Dickison, East St. Kilda, 22nd August, 1924.

The Yellow-Footed Pouched-Mouse.—In May last, whilst awaiting the train at Everton (Bright line) station, I paused near a clump of Red Box trees for an *al-fresco* lunch. Here I made my first acquaintance with a little animal which, on reference to "Lydekker's Marsupials" (Naturalists' Library), plate xxvii, I take to be *Phascologale flavipes*. I became so interested in the little creature that I almost missed the train. In the locality, tree-creepers (Climacteris sp.) were plentiful, and for a while, as the little marsupial dodged about among the leaves and sticks on the ground, and by the rapidity of its movements as it spirally climbed the trunk of a box-tree I took it to be one of these birds, but in its later actions it became more conspicuous and I could see it was not a bird. It moved spirally round the base of a box-tree, *Eucalyptus polyanthemos*, in little jumpy runs, then climbed a two-feet thick tree trunk in a

half spiral and disappeared, only to be seen again ten feet higher up on one of the tertiary branches in an incredibly short time. Thence it presently reached another branch, nearly three feet distant, by a horizontal jump, the same sudden and apparently effortless jump that is made by a Ringtail Possum. Appearing now here, now there, and often out of view, it seemed to be searching the bark for food, probably in the shape of beetles and other insects which were in crevices in the bark, hence it would be a good friend to the forester. As it may have been eating ants, I would be pleased to have confirmation or otherwise of my observations from some reader who has had better opportunities of seeing this little animal than I have had. Lydekker quotes Krefft as saying "that in confinement this species killed any number of mice put into the same box." Were domestic mice referred to?—A. D. Hardy, Studley Avenue, Kew, 14th August, 1924.

Corrections.—The following corrections should be made in the August *Naturalist*:—

Page 53, line 30: For "*Correa speciosum,*" read "*speciosa.*"
„ 55 „ 20 „ "*Kennedya pentaphylla,*" read "*Hardenbergia Comptoniana.*"
„ 58 „ 28 „ "*Acacna sanguisorba,*" read *Acaena sanguisorbae.*"
„ 58 „ 35 „ "*Pattersonii,*" read "*Patersonii.*"
„ 59 „ 44 „ "*coriaceum,*" read "*coriacea.*"
„ 68 „ 3 „ "*ramulosus,*" read "*ramulosa.*"
„ 68 „ 34 „ "*Acyphilla,*" read "*Aciphylla.*"
„ 72 name 18 „ "Astellia," read "Astelia."
„ 74 „ 20 „ "E. petrophylla," read "E. petrophila."
„ 75 „ 14 „ "H. teuchroides," read "H. teucroides."
„ 76 „ 34 „ "O. rosemarinifolia," read "O. rosmarinifolia."
„ 76 „ 38 „ "Orites lancefolia," read "Orites lancifolia."
„ 77 „ 1 „ "Phelabuim," read "Phebalium."
„ 77 „ 40 „ "R. Muellerii," read "R. Muelleri."
„ 73 Remove "Celmisia longifolia var. latifolia" from line 5 from bottom, and insert after line 26.
„ 74 Remove "Ewartia catipes" from line 7 from bottom and insert after name 20, "E. petrophila (E. nubigena = Ewartia nubigena).

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The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria

Published 9th October, 1924

Hon. Editor: F. G. A. BARNARD, Esq

The Author of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING.

MONDAY EVENING, 13th OCTOBER, 1924.

1. Correspondence and Reports.
2. Election of Members.

	PROPOSER	SECONDER
AS ORDINARY MEMBERS—		
Miss Mary I. Allfrey, 6 Kensington Rd., South Yarra	Mr. G. Coghill	Mr. C. Daley, F.L.S.
Mr. F. E. Greive, M.A., Wesley College, Prahran	Mr. C. Oke	Mr. E. A. Nye
AS COUNTRY MEMBER—		
Mr. K. F. Hatfield, "Talgai," Lilydale	Mr. L. Hodgson	Mr. F. Keep

3. Nominations for Membership.
4. General Business.
5. Remarks by Exhibitors relative to their Specimens.
   Ten minutes' adjournment for discussion of Exhibits.
6. Reading of Paper and Discussion thereon.
   By Mr. J. H. Harvey, F.R.V.I.A.—"From Brisbane to Maitland, N.S.W., via Tweed Heads and North-Coast Railway."
   The committee will be pleased to receive promises of papers for future meetings.
7. Reading of Natural History Notes.
   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same, that he may arrange for their bringing them before the meeting; such notices should, however, be brief.
8. Exhibition of Specimens and Conversazione.
   Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Club year ended on 30th April last. Any subscriptions overdue should be forwarded to the Hon. Treasurer **at once.**
Subscriptions for the year 1924-5 became due on 1st May.

SPECIAL NOTICE.—The attention of members is directed to item 8 of business paper. Notices of exhibits should, if possible, be type-written.

EXHIBITS FOR OCTOBER MEETING.

It is desired to make Exhibits with descriptive notes a special feature of this meeting.

EXHIBITION OF WILD-FLOWERS.

Members are desired to note that the above Exhibition will be held in the Melbourne Town Hall, on TUESDAY, 21st OCTOBER, and to communicate with friends in the country with regard to exhibits. Directions for collecting and packing flowers can be obtained from the Hon. Sec., Mr. C. Oke, 56 Chaucer Street, St. Kilda. Owing to the lateness of the date of the Exhibition, special efforts will be required to make a good display.

The Victorian Naturalist

Vol. XLI.—No. 6. OCTOBER 9, 1924. No. 490.

FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall, on Monday evening, September 8, 1924.

In the absence of the President, the ex-President, Mr. C. Daley, B.A., F.L.S., occupied the chair, and about forty-five members and visitors were present.

REPORTS.

A report of the excursion to Warrandyte, on Saturday, August 16, was given by the leader, Mr. C. Daley, B.A., who said that twenty-two members and friends took part in the outing, which was arranged for the purpose of seeing the Silver Wattles, *Acacia dealbata,* in bloom, along the river banks. Favoured by a pleasant day, though somewhat dull, the char-a-banc trip of about forty miles was much enjoyed. The wattles had suffered somewhat from the recent severe frosts, but there was enough bloom remaining in good condition to reward the excursionists for their long journey. The outing partook rather of a social nature, and little collecting was done.

A report of the excursion to Bayswater, on Saturday, August 30, was given by the leader, Mr. C. Oke, who said that there was a good attendance of members. Insects were rather scarce, the season being somewhat late, owing to recent cold weather, and few specimens of note were captured.

A report of the excursion to Alphington, on Saturday, September 6, was given by the leader, Mr. J. Stickland, who said that, notwithstanding the great increase of water in the pools, owing to the recent rains, specimens of pond-life were very numerous, but he had not yet had an opportunity of thoroughly examining the material brought home.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Wilson, 92 Park Street, South Yarra, was duly elected an ordinary member; and Mr. A. Wade, Ridley College, Parkville, an associate member of the Club.

GENERAL BUSINESS.

The Hon. Secretary called the attention of members to the Annual Exhibition of Wild-flowers, to be held in the Melbourne Town Hall, on Tuesday, October 21, and urged them to interest their friends in the country in the matter. Circulars had been prepared giving directions as to the collection and forwarding of flowers, copies of which could be had on application. He also asked for assistance at the Town Hall on the morning of the exhibition, and hoped a number of members would be able to give some time to the arranging of flowers, etc.

The increasing destruction of wild-flowers was referred to by several members. The quantities of Thryptomene exposed for sale in the city this season caused some comment. While some members thought that if carefully cut it would do no harm to the plants, others thought some action should be taken to regulate its collection. Mr. Oke said that on the previous day, at Ferntree Gully, he had seen two motor cars decorated with wild-flowers, more especially with the beautiful climber, the Purple Coral Pea, *Hardenbergia monophylla*, which, as everyone knows, quickly fades and withers when picked. Long streamers of this pea were entwined all about the cars and over the hoods. Both cars looked very pretty at the time, but the flowers would soon fade, and, besides, the display for future seasons would be lost. He thought that some action should be taken, or the beauty of the bush would soon be a thing of the past.

Mr. C. Daley, B.A., F.L.S., as one of the Club's delegates on the General Council of the Australasian Association for the Advancement of Science, gave a short account of the recent meeting in Adelaide, which he said was well attended, and he was pleased to see several other members of the Club amongst those present. He said that the programme of lectures, addresses and papers was a very full one, and had been well attended. The excursions were of an interesting nature, and he considered the meeting a great success and trusted much good would result from it.

PAPER READ.

By Dr. W. MacGillivray, entitled, "A Trip to South-west Queensland" (continued).

This was the concluding portion of the paper commenced at the previous meeting, and dealt principally with the floral

features of the trip from Charleville back towards Broken Hill, and revealed what a splendid display is made by the flowering plants and shrubs during a good season, in a region which is generally regarded as the last place to look for flowers.

Several members spoke as to the interest of the papers, and expressed surprise at the variety of vegetation in a part of the continent which is generally regarded as arid and desolate.

EXHIBITS.

By Miss E. C. Cameron About a dozen species of Mallee flowers from Tempy, N.W. Victoria.

By Mr. C. Daley, F.L.S.—Purple Slate or Shale from Mount Lofty, S.A.; Aboriginal implements—chipped stones (scrapers) from S.E. of Lake Eyre, and hammer stones from Costal Midden, South of Marino, S.A.; Obsidian Button from Lake Eyre district; seeds of *Abrus precatorius,* Jequirity or "Lucky Seeds" from North-west Australia.

By Mr. C. Oke—Copperhead Snake, *Denisonia superba* from Preston.

By Miss G. Nokes—Flowers of orchids, *Caladenia carnea;* "Pink Fingers" and *C. deformis,* "Blue Faries" from Sandringham.

After the usual conversazione, the meeting terminated.

The Smoker Parrot.—A correspondent at Ouyen records in the *Argus* "Nature Notes" the breeding of this bird, known variously as the Black-tailed Parrot, Rock Pebbler, or Regent Parrot, *Polytelis melanura,* in captivity. A dozen eggs were laid, but only six were sat upon, the result being two fine birds now a year old.

Death.—As we go to press the death is announced of Mr. L. B. Thorn, a member of the Committee of the Club, and an enthusiastic lepidopterist. Further particulars will appear in the next *Naturalist.*

Correction.—August *Naturalist,* page 60. The conclusion of the third paragraph should read:—". . . . specimens of gneiss, mica schist (or alternatively phyllite), and regmatite, the minerals comprised felspar, muscovite and quartz."

IN THE STRATHBOGIE RANGES.

By F. PITCHER.

(Read before the Field Naturalists' Club of Victoria, 14th August, 1924.)

[ABRIDGED.]

Nothing has hitherto appeared in the *Naturalist* regarding the Strathbogie Ranges, a tangled group of granite hills situated between Euroa and Mansfield. The highest hill, Mt. Wombat, rises to 2600 feet, or about 1800 feet above the surrounding country. One of the most regular and consistent contributers of wild-flowers to the Club's annual exhibitions has been Mrs. Evans, of "Flowing Vale," Lima East. This lady had often pressed me to pay her district a visit, but circumstances did not allow an opportunity until April last, when, with my wife, I accepted the invitation. To reach Lima East necessitated a journey of 135 miles by rail, via Benalla, on the North-eastern line. Here a branch line runs almost due south, ending at Tatong, a few miles beyond Lima, where there is a considerable saw-milling industry. We were met at Lima, and motored out to "Flowing Vale," a distance of some five or six miles. Here we were among the foothills of the Strathbogies.

A short ramble on the afternoon of our arrival soon showed us that the district would be a prolific collecting ground in the spring and early summer. Among the granite rocks the well-known Rock Fern, *Cheilanthes tenuifolia,* grew luxuriantly with fronds of more than eighteen inches in length. An epacrid, *Melichrus urceolatus.* R. Br., Urn Heath, having ashy-green foliage, was rather common and well in flower. The Golden Everlasting, *Helichrysum lucidum,* brightened the locality with its golden heads of flowers. Here also was the Finger-flower, *Cheiranthera linearis,* A. Cunn. but not bearing its beautiful blue flowers. Later I obtained some plants which I handed over to the Botanical Gardens on my return to town.

A few days later we visited the Newbery, or Newton, Falls, situated at the head of a valley east from Sugar-loaf Peak, about three miles away. This walk revealed many other interesting plants and shrubs. The district reminded one of the Grampians, especially as the Common Fringe-myrtle, *Calytrix tetragona,* was very abundant. The Box-leaf Acacia, *A. buxifola,* was promising a fine display of bloom in a few

weeks' time. The Mountain Grevillea, *G. alpina*, and the Hairy Geebung, *Persoonia rigida*, were also noted. The only orchid seen was the Striped Greenhood, *Pterostylis reflexa*. The falls were about 40 feet in height, and when well supplied with water must be an imposing spectacle, the water falling over immense granite boulders in its descent to the basin below. Ferns of various species were fairly plentiful. A number of young plants of the King Fern, *Todea barbara*, was obtained for home cultivation, the glossy surface of the leaves making this fern an attractive pot plant. The maidenhair fern, *Adiantum Æthiopicum*, was luxuriant in its frondage, many fronds measuring eighteen inches in length.

Next day the Lower Lima Falls on the Sugarloaf Creek were visited. On the way thither some fine young Blue Gum Eucalypts, *E. globulus*, twenty to thirty feet in height, were passed, the foliage of the upper portions of these was the typical long strap-like leaves, many measured were over 20 inches, and one was 25½ inches by 3½ inches wide, while the lower portions of the trees were still bearing the rounded silvery-grey juvenile foliage, the whole making a beautiful picture in the bright sunlight. Here also the Common Bracken was of very strong growth. One frond I cut measured seven feet three inches in length. Though an old fern collector, I found here my first specimen of the Meadow Moonwort, *Botrychium australe*, a widely-distributed plant, but nowhere plentiful. Being strange to me, I first took it to be some introduced plant. The Blanket Fern, *Pleurosorus (Grammitis) rutifolius*, grew in the crevices of the rocks. The Correa and other shrubs bordered the pathway, while the Drooping Mistletoe was seen on the branches of many of the gum trees. The rocks along the track were of immense size and various shapes, reminding one of ruined castles or ancient cathedrals.

Our rambles in the district were interrupted by a visit to the Dookie Agricultural College, some forty miles away on the other side of Benalla. This proved very interesting, but hardly comes within the scope of my paper. However, advantage was taken of a few minutes' wait at Benalla to visit the Public Gardens, prettily situated on the banks of the Broken River. Here some very fine Eugenias were bearing a wealth of their pink fruits, making a handsome sight. Numerous fine coniferous trees testified to the suitability of the situation for their growth.

The next day was spent in a visit to the main Lima Falls, a journey of about six or seven miles, and situated somewhat further away than the other falls, and in steeper and more rugged country, necessitating the use of horses. On this occasion we were accompanied by the local schoolmaster, Mr. Jordan, and Mr. Lewis, a recent arrival from England, who was studying Australian farm life at "Flowing Vale." The trees were larger and shrubs more plentiful, but did not offer a greater variety than we had already seen. The falls were carrying a good volume of water, and looked well in the bright sunlight. Some time was spent in the vicinity, but no new ferns were noted. From the top of the falls a fine view was obtained of the immense rocks forming the crest of the Sugarloaf Peak.

Our stay with the Evans family was a most pleasant one, and, as Mr. Evans was one of the pioneers of the district, he was able to give us an amount of historical information which was extremely interesting. Mrs. Evans proved herself an ardent lover of our native flora as well as a most enthusiastic collector and capable guide in this trackless district.

The district is one which, in the right season, would make an excellent exploring ground for a Club party, and I hope to hear that an effort will be made at an early date to visit these ranges *en masse*.

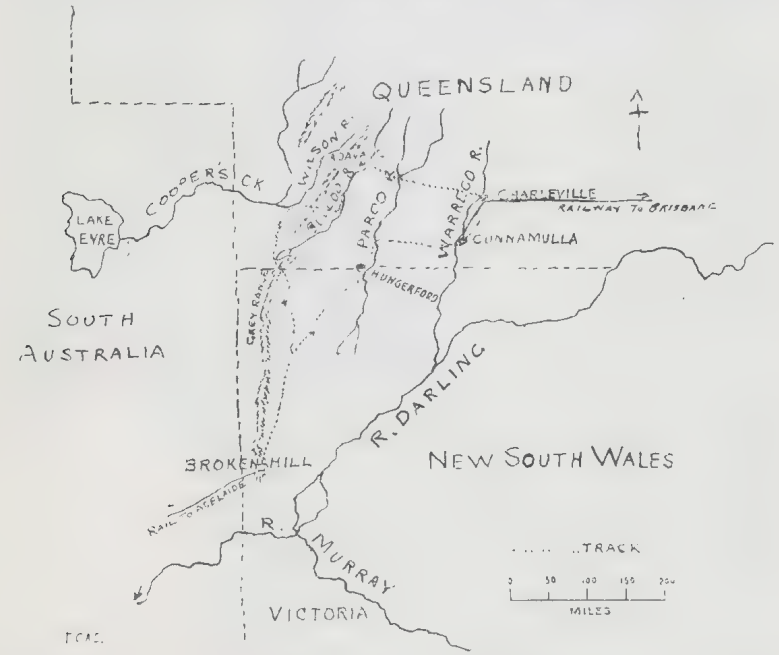
MUTTON BIRDS.—An interesting article by Mr. F. Lewis, R.A.O.U., Acting Chief Inspector Fisheries and Game Department, Melbourne, appears in the October *Emu* (Vol. XXIV, pages 1, 2), giving details of a number of observations made at Phillip Island, Westernport, Victoria, regarding the return of the birds to their breeding burrows during the seasons 1920-23. This bird, *Puffinus tenuirostris*, also known as the Short-tailed Petrel, arrives in great numbers from 26th to 30th November each year for breeding purposes. The eggs are large for the size of the bird and are much sought after by residents and others for culinary purposes. The question has arisen whether, when the first egg is taken, the birds lay again. Mr. Lewis' experiments seem to be fairly conclusive that the birds do not lay more than one egg, but that they return to the same rookeries, and often actually to the same holes each year. From these facts it should be possible to frame regulations which will give the birds that measure of protection which is badly needed at the present time, as there is evidence that their numbers are gradually decreasing.

AN EXCURSION IN SOUTH-WEST QUEENSLAND

By Dr. W. MacGillivray, Broken Hill.

(Read before the Field Naturalists' Club of Victoria, 11th August and 8th September, 1924.)

On August 15, 1923, four of us, Dr. Chenery, interested, like myself, in Ornithology; Mr. P. C. Riddell, principal of the local Technical College, and our driver, Norman Reid packed all our camping gear, with sufficient petrol to take



us to the nearest rail-head in Queensland, and took the northern road leading from Broken Hill. The previous year had been one of drought, but good rains had fallen in the autumn and in early winter; all growth, however, had been retarded by severe frosts, but for all that, the country was becoming green from herbage that had to seize any opportunity to reproduce itself. Birds were very scarce, the majority not having returned after having left the district for more favoured localities during the dry year.

Our road took us out on the eastern side of the Barrier range, crossing Stephen's Creek at nine miles, then Yalcowinna Creek 10 miles further out. A few Little Corellas,

Cacatua sanguinea, and Galahs, *C. roseicapilla*, were seen feeding on the ground or flying along Campbell's Creek. On the gravelly country that we passed over before reaching this creek, the ground was white with the Hairy Cress, *Blennodia lasiocarpa*, and to a lesser extent with the Yellow Cress, *B. nasturtioides*, with the Woody Cress, *B. trisecta*, and the blue *Erodium cygnorum* by way of contrast in smaller patches. *Craspedia chrysantha* was mostly in bud, with *Helipterum polygalifolium*. Areas of the nasty-smelling cruciferæ, *Blennodia cardaminoides*, were soon forgotten in contemplating the gloriously-yellow single plants of *Senecio gregorii*.

At about forty miles we enter the Eurowie Hills, where the vegetation is again not so forward. Occasional creeks, lined with Red gums, *Eucalyptus rostrata*, which provide nesting hollows for a few Galahs, Little Corellas, or Ringed-Neck Parrots, *Barnardius barnardi*, are crossed at intervals. The Rocky Hillsides are clothed in Mulga, *Acacia aneura*, Dead Finish, *A. tetragonophylla*, *Eremophila alternifolia*, and *E. oppositifolia*, with *Acacia oswaldi* along the smaller water courses. Emerging from the hills to the more open country we find patches of the Yellow Everlasting, *Helipterum polygalifolium*, well in flower. On to Eurowie, fifty miles from the Hill, the road traverses open gravelly slopes which in places are mantled with a snowy covering of *Blennodia lasiocarpa*. From Fowler's Gap to Sandy Creek Bore we pass over an open gravelly plain with a gum creek away to our right and the Barrier Range out to the left. From this plain we flush a few Australian Dottrell, *Peltohyas australis*; Orange Tangs, *Ephthianura aurifrons*, and an occasional Pipit, *Anthus australis*. Beyond the Bore the country becomes sandy with a ground flora of New Zealand spinach, *Tetragonia expansa*, and young plants of the Ham and Eggs Daisy, *Myriocephalus stuarti*, some only of which are in bud.

Bancannia Lake, 100 miles from Broken Hill, is reached late in the afternoon, as our motor had not been working too well. We leave the northern road eight miles further on, going off to the right, still through sandy country. Caterpillars are numerous, the New Zealand Spinach being eaten in many places to bare stalks. We disturb numbers of Whistling Eagles, *Halliastur sphenurus*, and a few Black Kites, *Milvus torshun*, from the ground where they had been feeding on the caterpillars. These insects were at all stages of development, from tiny newly-hatched ones, to the fully

matured grubs that were burrowing into the sand to pupate. Little Corellas, *C. sanguinea*, and Galahs are becoming more numerous on the creeks that we pass. After passing Nundora Station we came to a gate, from one of the posts of of which a Galah flew. We afterwards learn that a pair of these birds had nested in the same post for the past three seasons, and we are advised to keep a look-out when approaching another gate about six miles on from Woonaminta Station, which we reach about an hour after dark, after negotiating several bad creeks and washaways, but the welcome that we receive from Mr. and Mrs. Jackson makes light of all our troubles.

The next morning is spent in looking round the homestead; the dams are all full and the young red gums along the creek looking fresh and well owing to the recent local rains. All old trees had been cut out years before to feed the furnaces of a woolscour. Fairy Martins, *Hylochelidon ariel*, were busy building their nests under sheds and verandahs until the arrival of a Goshawk sends them all high in the air to wait there until he departed, when they came down and started gathering mud along the water edge, with which to construct their retort-shaped nests. We were shown the site of a Greenie's *Meliphaga penicillata*, nest in a climbing plant on the verandah. Many White-Browed and Masked Wood Swallows passed overhead on their southerly migration, some dropping out to feed or rest for the night. The walls of the house are of pisa protected by plaster. In a place where the plaster had fallen off, a Red-Backed Kingfisher, *Halcyon pyrrhopygius*, had burrowed in, and reared a brood of young a season previously. Striated Pardalotes, *P. striatus*, also regularly build in these walls, and the White Face, *A. leucopsis*, in the guttering of roofs.

Leaving Wonnaminta after lunch, the solitary Koonenberry Mountain soon looms up, and our road winds round its eastern end, which is continued for a considerable distance as an outcropping ridge, and the gravelly plains that we pass over are a result of this mountain's denudation. These plains bear a picturesque appearance, consisting of pure white patches of quartz or blossoming *Blennodia lasiocarpa*, alternating with others of vivid green Spinach and other herbage, and others of a dull yellow colouring due to *Blennodia nasturtioides*, or a bright golden yellow with the Sunray, *Helipterum polygalifolium*. After crossing we pull up within two miles of the foot of the mountain, and walk over

to it as I was anxious to get an idea of the survival vegetation on the crest of this residual. The first mile was over a plain occupied principally by *Atriplex vesicarium*, the species of perennial saltbush which above all others makes it possible for the Western Darling country to be used for grazing purposes, and gives a name to the saltbush plains. *Helipterum floribundum* was mostly in bud; a brilliant-white Sunray, which at times covers large tracts of country, and which is a valuable fodder plant. The crabholes (soakage depressions), that are found on sandy and gravelly plains, were here occupied principally by two composites, a small yellow-flowered Groundsel, *Senecio brachyglossus*, with bright green foliage which appears more green than yellow in the mass, as the flowers are inconspicuous, and *Helipterum strictum*, a small white flowering annual with dark green foliage. Occasional clumps of the fleshy Groundsel, *Senecio gregorii*, made splashes of brilliant yellow at intervals, with *Helipterum polygalifolium* in small communities. No grass except some very young stuff just showing above the ground, was to be seen. A White-fronted Tang, *E. albifrons*, is disturbed from her nest low down in a saltbush, the nest containing three hard-set eggs, to which the bird soon returned when we went on. Shortly after an Orange Tang, *E. aurifrons*, flushed from her nest well concealed also in a saltbush; this nest contained three eggs of the Tang and one of the Narrow-billed Bronze Cuckoo, all nearly hatching.

We pa[ss] a few stunted Belars, *Casuarina lepidophloia;* Bullock Bushes, *Heterodendron oleifolium*, and Mulgas, *Acacia aneura*, scattered at long intervals over the plain. A gum creek, bordered as usual with *Eucalyptus rostrata*, crosses our path, and winds its way through a gap in the ridge. Crossing this we start climbing the foothills, on which Needle Bush, *Hakea leucoptera;* Belars, *Casuarina lepidophloia;* Leopard Trees, *Flindersia maculosa*, and Dead Finish, *Acacia tetragonophylla*, makes an open scrub. Up the mountain, Mulga and Dead Finish are the principal trees. *Eremophila oppositifolia* and *E. alternifolia* are flowering, and *Cassia sturti* showing signs of revival, after being dry and miserable, form the underscrub. On top, a few ragged pines, *Callitris robusta*, grow from crevices in the big boulders that cap the mountain. Other plants are *Solanum ellipticum*, *Isotoma petraea*, *Parietaria debilis*, *Leptorrhynchus panaetioides*. The Eriostemon, which I am anxious to find, proves to be identical with the species

found on Mt. Manara, on the opposite of the Darling Valley, and not with that found on the hills near Broken Hill. Bird life in scarce, Red-capped Robins, *P. goodenovii*, and Little Crows, *C. bennetti*, and Chestnut-eared Finches, *Taeniopygia castanotis*, only. Dr. Chenery found a nest of the Wedge Bill, *Sphenostoma cristatum*, in a Dead Finish, containing two half-fledged young and the nest of a Singing Honey Eater, *M. virescens*, with two hard-set eggs; the nest was unusually placed, being two feet from the ground in a Kochia. A small flock of Sitellas, *Neositta pileata*, were busy searching the Mulgas for food. A Shingle-backed Lizard, *Trachydosaurus rugosus*, on the plain is photographed and allowed to go. This lizard is vegetarian and viviparous and is capable of aestivating for long dry periods of two or more years, during which time they remain buried in the ground, usually under the roots of some perennial bush. We inspect an old nest of the Wedge-tailed Eagle on one of the creek gums, note many Galahs and Little Corellas, a few Ravens, *C. coronc*, and Magpies, *G. tibicen*, and a lot of Miners, *Myzantha flavigula;* Pardalotes, *P. striatus*, and Greenies, *M. penicillata*. It is late when we return to the motor, so we decide to camp on the first creek; our motor decides, however, that we stay for three days.

A Magpie wakes us early as she is incubating in a sapling close to our camp, two Miners' nests are quite near, and a Crested Bronzewing Pigeon is feeding two young in a nest in an Acacia cana about 100 yds. away. The Miners tune up soon after the Magpie, followed by Galahs and Corellas, with a Whistling Eagle a good last. After breakfast, Mr. Riddell and myself cross a gravelly plain to an elevation near Koonenberry; on this we find a few stunted *Acacia cana* and Belars, big bunches of *Sarcostemma australe*, a few bushes of *Eremophila Duttoni*, and a fine flowering bush near a rabbit burrow of *Senecio magnifica*. One of the Casuarinas supports an old nest of the Wedge-tailed Eagle, *Euroaetus audax*, the top of the nest being six feet from the ground and the bottom two feet. We return to camp, inspecting another Eagle's nest on the way. After a short rest we go on to a small bare plain covered with remains of Aboriginal fireplaces, with many flint and other chippings. Dr. Chenery, who had been down the creek, reports the presence there of the Black Honeyeater, *Myzomela nigra;* the Pied Honeyeater, *Certhionyx variegatus*, and *Malurus assimilis*. After lunch we go down to look these birds up and find them feeding on

the honey-laden flowers of *Nicotiana glauca*, the introduced Tobacco Bush. This bush does little harm, grows usually where nothing else will grow, often shelters a lot of useful herbage, and provides food for a number of honey-eating birds, who are also useful as insect destroyers, to tide them over dry seasons.

A Whistling Eagle was noted building, and a Little Eagle, *Hieraetus morphnoides*, sitting on one egg in her bulky nest at the top of a slender gum.

On the following day we go in a south-easterly direction through scattered *Acacia cana* bushes, in one of which a Singing Honeyeater, *M. virescens*, has a nest and three eggs We ascend a rocky pinnacle to get a view of the surrounding country and note a fairly thick scrub to the south-east, which we go down to examine. On our way we note the Pied, the Black, the White-plumed, and Spiny-cheeked Honeyeaters, Brown Song Lark, Yellow-throated Miner, Crimson Tang, and Brown Quail. The scrub we find to consist principally of *Acacia cana* with an odd group of Leopards and Belars. The ground being covered with low bushes of *Eremophila maculata* in full flower, these flowers are honey laden and provide a plentiful supply for the Honeyeaters mentioned, which are here in numbers.

Eremophila maculata shows a big range of colours, from bright red, through maroon, terra-cotta, pink, to creamy white, with foliage also varying from bright green to dark purplish red. *Myoporum acuminatum* and *M. deserti* are also growing in this association with *Jasminum lineare* supporting itself on these or other shrubs. Growing up through many of the bushes were the beautiful white or mauve daisies, *Minuria denticulata*, and *M. leptophylla*, and all through the patch at intervals, *Senecio gregorii* and *S. lautus*. Dr. Chenery was not long in finding a nest of the Pied Honeyeater, placed low down in the dead *Eremophila maculata*, through which was growing *Enchylaena tomentosa* in berry, and a white *Brachycome*. This nest, open and cup-shaped, was composed of dried stalks of herbage and rootlets, and lined with finer rootlets. Several nests of *Glyciphila albifrons*, the White-fronted Honeyeater, were found at all stages, containing part or full clutches, or young birds newly hatched, to others that were almost ready to leave the nest. These nests were mostly placed low down in the *Eremophilas* and well hidden. The Black Honeyeaters, *Myzomela nigra*, were seen, but had not yet started to nest. After lunch, Mr. Riddell and myself explored a stony and scrub-covered hill

PLATE IV.

"YELLOW-TAILS" *Trichinium Nobile,* LIND.
(The flower spikes are 3-4 inches high.)

A MIXED COMMUNITY
(Mostly Composites of various Species.)

to the east of the camp. Two old Wedge-tailed Eagles' nests were examined, a Spotted Nightjar, *Eurostopodus guttatus*, flushed, and a nest, composed almost wholly of sheeps' wool, of the Singing Honeyeater found in an *Acacia cana*. Other trees and shrubs on this hill were *Acacia aneura*, *A. tetragonophylla*, *Exocarpus aphyllus*, the Quondong, *Fusanus acuminatus*; *Eremophila duttoni*, and masses of *Sarcostemma australe*. On the following morning, the 9th August, we made a further examination of the *Acacia cana*—*Eremophila maculata* flat, with a view of getting photographs of the various nests and other objects of interest. This being accomplished, we return to camp to find that the parts of the motor for which we were waiting had arrived, so that we were able to continue our journey to Morden Station, where we put in the following night, being hospitably entertained by Mr. and Mrs. Con. White.

The road to Yancannia, which we traversed on the next morning, passed over gravelly open country, on which *Blennodia lasiocarpa* and *B. nasturtioides* were flowering freely, with smaller patches of *Goodenia glauca* and *Helipterum polygalifolium*; elevations support a little scrub, mostly Mulga and Dead Finish; the latter is in flower, but cannot disguise its rugged form and prickly *Phyllodes*. On Sandy tracts the big daisy, *Myriocephalus stuarti*, is well in flower. *Craspedia pleiocephala* is also here. We came to the gate six miles from Morden, in one of the posts of which we had been told to look for a Galah's nest; the pair of birds were there and had been bedding the hollow with green gum leaves carried from an adjacent gum creek. Crossing a creek, our attention is attracted to numbers of tussocks with a yellow button-like inflorescence, *Craspedia globosa*. That fine shady tree, the Whitewood, *Atalaya hemiglauca*, now appears singly and in clumps, and the sandy ridges show a more varied scrub, Mulga, Dead Finish, *Acacia Burkitti*, with *Eremophila longifolia*, *E. sturti*, *E. oppositifolia* in flower; and, later on, *E. alternifolia*. Along the watercourses one sees mostly Belar and Mulga. In moister flats, the Lavender Daisies, *Brachycome sp.*, which vary in shade from light to very dark. *Myriocephalus stuarti*, and occasional plants of the beautiful purple pea, *Swainsona procumbens*, well in flower. We arrive in Yancannia in time for lunch, which delays us three-quarters of an hour. A fine crimson flowering Eucalypt, of Western Australian origin, makes a beautiful object in the garden. A graceful tree with smooth

white stem and branches, and small lanceolate leaves, it is well in flower; these are large and of a beautiful crimson colour; it is probably the Mt. Lindsay gum, *E. erythronema*, a very desirable ornamental gum for drier parts of Australia.

We are soon on our way again, our road leading us down the creek through a rank growth of herbage till we are able to cross the water-hole, the only permanent natural water-hole in New South Wales west of the Darling. Over more gravelly plains covered with wild flowers, down along a creek where we note the Moulie Apple Tree, *Owenia acidula*, with its dark, glossy pinnate leaves and bushy rounded top, always a beautiful object. It bears a dark purple fruit about 1 in. by 1½ in. in diameter, nearly all stone, and often eaten by Emus.

Bootra Station is our next stopping place, only long enough to inquire the way, as we are anxious to push on. Shearers have just arrived, after cutting out at Mt. Sturt, and are to start operations on the following day. We go almost due east from here and take a road past the shearing shed, which is some distance from the house, through thick scrub, mostly of Mulga and Bullock Bush with an undergrowth of Turpentine, *Eremophila sturtii*; *E. duttoni*, *E. longifolia*, and a carpeting of Crucifers, Composites, and other herbage. Birds other than Galahs are scarce, but later on we note a Spotted Harrier, *C. assimilis*; many Short-billed Crows, *C. Bennetti*; Singing Honeyeaters, *M. virescens*; Miners, *M. flavigula*; Red-capped Robins, *P. goodenovii*; Greenies, *M. penicillata*. The crows are nesting freely in the Mulga and, pulling up the car under a Mulga, a Wedge Bill flushes from her nest in a bunch of *Loranthus pendulus*. Dr. Chenery finds it to contain three of this bird's beautiful blue spotted eggs. It is almost dark when we come to a dam and pull off the road to a camping place on a box creek, the trees bordering it being mostly Bimble Box, *Eucalyptus populifolia*, a tree with very distinctive rhomboid or rounded green leaves. The harsh calling of a Short-billed Crow wakes us early, to be followed by the beautiful notes of the Rufous Song Lark, *Cinclorhamphus mathewsi*, from the creek quite near our camp. Its nest is afterwards found in the Spinach growing in the bed of the creek, an open cup-shaped structure lined with bark, and constructed of coarser bark, built into a depression scraped in the ground; it contained three fresh eggs. Down the creek a Spiny-cheeked

Honeyeater has her nest in a Mistletoe on a Mulga, and a pair of Galahs had been vainly trying to bed a hollow stump with gum leaves without result, as there was a hole at the bottom through which the leaves fell to form a considerable heap at the foot of the stump. A Crested Pigeon, *Ocyphaps lophotes*, is on her nest in a Mulga also.

We make an early start up past the dam to pick up our road. The day is beautifully fresh and sunny, with a light south wind blowing, as we pass through open scrub of Mulga Whitewood and Bullock Bush to No. 3 Bore, where we come upon a mob of about 150 Emus feeding on the herbage. An Eremophila, *E. Bowmanni*, here attracts our attention, its foliage being silvery grey with large lilac flowers, and is new to us. An *Acacia ligulata* growing by the bore, is showing a few flowers. We take a right-hand track and pass through a stunted growth of this species for some distance; further on we come to a fine, tall Acacia, with a trunk 18 inches to two feet in diameter, which is a stranger, and which we found to be Ironwood, *A. excelsa*, and later became a feature of the landscape until we reach the Queensland border, many of these trees being 50 feet in height. We now pass through thick Mulga and Bullock Bush scrub for some distance till we come to No. 6 Bore, where a tall cypress-like tree is recognised as being identical with one that had grown up on a barren stony spot on the British Mine at Broken Hill. *Codonocarpus cotinifolius*, like its near allies the members of the genus *Brachychiton*, it is pithy and reputed to be good fodder for stock. It is locally known as Mustard Bush. Water is lying in all claypans and depressions, herbage good all the way, and many wild flowers, *Blennodia canescens*, *Brachycome ciliaris* and *Helipterum poligalifolium* prevailing.

We reach Eurosino Station, where we are hospitably entertained by the manager's wife, Mrs. Lawton, and are relieved to find that we have only 25 miles of good road to negotiate before reaching our destination on the Paroo Wanaaring township. It is soon over, and we enter through shrubby growth of *Eremophila sturti*, *Dodonaea viscosa*, and the Aster, *Olearia pimeleoides*, the latter being finely in flower. The township consists of a dozen or more houses ranged along the main road on the banks of the Paroo; there are several empty ones and many ruins. The Paroo has recently been in flood, but is now only trickling between holes. Immediately below the town, along the water's edge, are growing

a Bimble Box, *E. populifolia;* Black Box, *E. bicolor;* Yapunyah, *E. ochrophloia,* and the Red Gum, *E. rostrata.* A local garden contains two date palms, each about 12 feet in height. These palms do well in this district; there are several fine examples on various stations along the Darling, some planted in early days being 40 to 50 feet in height and bearing large quantities of fine fruit annually. They come into bearing when about ten years old, and practically go on for ever; they should be planted in groups or avenues to facilitate fertilisation, as the sexes are on different trees. At present Australia is importing £600,000 worth of dates annually, and all that we require could be grown here.

Our road from here runs north parallel with the Paroo, and the vegetation passed by varies as the country is subject to inundation or the sandy bordering of the river. The prevailing timber trees on the sandy country are Mulga, Beefwood, *Grevillea striata;* Whitewood, with Ironwood, are the largest and the most conspicuous. We learn from the locals that it is so named because the wood is so hard as to be almost unworkable. On the flooded ground the most conspicuous tree was the Yapunyah, which was blossoming freely, with flowers half an inch in diameter, these being a great attraction for numbers of honey-eating birds. The Bimble Box, with its glossy, bright green leaves, is always attractive, especially the foliage of the young saplings; even the dry leaves that have fallen to the ground shine like pieces of glass when reflecting the sun's rays. Harmonious Thrushes are common along the river, though seldom seen outback. The Red-backed Parrokeet, *P. haematonotus,* follows the river timbers and never ventures away from them. Miners and Spiny-cheeked Honeyeaters are feeding on the flowers of the Yapunyah and frequenting the scrub and under scrub; Pallid Cuckoos are recognised by their mournful calling. About 15 miles from Wanaaring the Bloodwood, *E. terminalis,* adds itself to the timber on the sandy country. On the river soil we find *Acacia stenophylla,* which always keeps to this habitat. The Queamurra, *Eremophila bignoniaeflora,* and Lignum, *Muehlenbeckia Cunninghamii;* and, nearer the edge, occasional bushes of the Lignum-like *Eremophila polyclada.* The Wild Orange, *Capparis Mitchelli,* is occasional on the sandy country. At Willara Station we have lunch with Mr. and Mrs. Stalley, and admire a magnificent Lemon-scented Gum, *E. citriodora,* growing in the garden, where it had been planted many years previously

Its bole was fully two feet in diameter. The children here were being taught from the State Correspondence School in Sydney, and seemed to be making good progress in their studies.

Our next stopping place is Talyalya Station, owned by an old friend, Mr. Austin Clune. Our radiator is leaking badly, so that our driver has to take it off to solder the leaks, the rest of us walking on till he overtakes us. The road passes over sandy ground with the same class of timber and underbush. A single Grey Falcon is seen, also Brown Hawks, *I. berigora;* Whistling Eagles, Little Crows, Galahs, Ring Necks, and Blue Bonnets, *P. haematorrhous.* We have not seen any Little Corellas, *C. sanguinea,* since leaving Bootra. Crested Pigeons, *Ocyphaps lophotes,* are common; Red-capped Robins, Singing, Spiny-cheeked, White-Plumed and Black Honeyeaters. Dr. Chenery found a nest in a charred Mulga stump of the Chestnut-tail Tomtit, containing three fresh eggs, and we note many of the birds. Whitefaces, *A. leucopsis,* are common.

Nearing Hungerford, the border town, we pass first through an avenue of Black Box, *E. bicolor;* then an underscrub of Turpentine, *Eremophila Sturti,* and *Dodonaea viscosa.* The first building we come to is the Post Office on the New South Wales side; all the rest are in Queensland. We make a few inquiries and, as it is near nightfall, push on to find a camping place before dark. We recross the bed of the Paroo to regain the eastern side, and camp for the night. A Boobook Owl had been calling, but the first streak of day was greeted by the gloriously mellow notes of the Pied Butcher Bird, *C. nigrogularis* followed by those of the Harmonious Thrush, *C. harmonica.* White-browed Wood Swallows are numerous and building their nests. The Little Wee Bill, *S. brevirostris,* is searching the box leaves for smaller forms of insect life, hovering in front of the branchlets or clinging to them when effecting a capture. Our road still follows the course of the Paroo, mostly on flooded country, which supports a more varied tree population—Bimble and Black Box, Yapunyah, still flowering freely and in places forming forests by itself. The Red Gum keeps to the actual watercourse. On sandy stretches we have Mulga, Gidgee, *A. Cambagei;* Ironwood, *A. excelsa;* Beefwood, *Grevillea striata,* with Bloodwood, *Eucalyptus terminalis,* in flower, making a fine show with its corymbose inflorescence; the trees of this species here are

much larger and finer than those in the north-west of New South Wales, owing to the greater average rainfall. All these trees have a grey scaly bark on trunk and limbs. We still have an undergrowth of *Dodonaea viscosa*, but the Turpentine, *Eremophila Sturti*, is gradually being replaced by one of larger growth, with darker bark and broader green leaves without the gummy exudation, *Eremophila Mitchelli*. The Lavender-flowered Eremophila is also being replaced by one with darker green leaves and a light blue flower, *E. Goodwini*. As we go north Gidgee becomes more common than our old friend the Mulga, and has *Eremophila Latrobei*, with its crimson flowers as an undergrowth, and we find whole tracts of country covered with *Eremophila Goodwini*, which is rarely more than two feet in height. We meet here with the Grey-crowned Babbler, *Pomatostomus temporalis*, replacing *P. ruficeps* and *P. superciliosus*, the common species in West Darling country. The two Friar Birds, *P. corniculatus* and *P. citreogularis*, soon make their presence known, from amongst the flowering Bloodwoods and Yapunyahs. Much of the timber in the paddocks bordering the road has been ringbarked, and the ground covering varies from dry and dead herbage in places where no rain had fallen recently, to others that had been favoured with a thunder storm, and here we find the ground covered with a sweetly-smelling composite, *Calotis Plumulifera*, or *Blennodia canescens*, and the Lavender daisy.

We arrive at Eulo at about 2.30 p.m. on August 23, a small township marking the turn off to Cunnamulla, which road we take through a fairly-thick scrub of Mulga, Gidgee and Beefwood, with undergrowth of Turpentine and *Dodonaea viscosa*, which soon opens out until we come to the gravelly ridge which marks the divide between the Warrego and Paroo Rivers. A beautiful hop bush, *Dodonaea boroniaefolia*, with pinnate leaves and small seed vessels in all shades from pale yellowish green to richest dark crimson, attracts our attention. *Cassia artemisioides* is also finely in flower, the flowers being larger and the leaflets broader than those of the species found at Broken Hill. Brown Tree Creepers are common; also Grey-crowned Babblers, Magpies, Garrulous Miners, which have replaced the Yellow-throated species; Greenies, Blue Bonnets, *P. haematorrhous xanthorrhoea*; Ring Necks, *B. barnardi*; Major Mitchells and Galahs.

Our road takes us over some very bare country, evidently subject to inundation, on Moongaree Station. On this a

few isolated specimens of *Swainsona procumbens* are flowering, and a few daisies. The Wilga, *Geigera parviflora*, graces the landscape more often, with its fine dark green bushy growth, and is in flower and scenting the atmosphere. Nearing the Warrego the country is still open, but being dotted with shapely Wilgas and symmetrical White Pines, *Callitris robusta*, has quite a park-like appearance. The road winds through the Red Gums and the Box Trees of the river frontage before crossing the bridge leading to Cunnamulla, a prosperous town of from 1500 to 2000 inhabitants, in which many new buildings are going up, including a shire hall, a general hospital, and maternity hospital. The streets are well planted with the common and Broad-leafed Peppers and White Cedars. A Bottle Tree, *Brachychiton rupestris*, with its curious bulging stem and fine-foliaged top, is both an ornamental and useful shade tree. It was not far north from here that this species was first found by Major Mitchell. Water is laid on all over the town from a fine artesian bore, which has a daily flow of over one million and a quarter gallons, coming from the pipe at a temperature of 107 Fahr. It is a soft alkaline water, with a slightly chlorinous odour. Peaceful Doves were cooing in the street trees, and numbers of Fairy Martins nesting under the high-arched roof of the railway station.

The road from here to Charleville, a distance of 125 miles, was quite perfect for travelling, and in places quite picturesque, as it went north between the river and the railway line amongst finely-timbered country, the trees being mostly Yapunyah, Bimble Box, Bloodwood, Coolibah, *E. microtheca;* Wilga, Ironwood, Gidgee, Mulga, and Beefwood, with White Pines on the sandy patches. *Capparis Mitchelli*, the Caper or Wild Orange, was finely grown and in green fruit. *Eremophila Mitchelli* was more plentiful, *Eremophila longifolia* occasional, as it had been all the way, and *Eremophila bignoniaeflora*, keeping to flooded country as always. The last two have long flowering periods. The Warrego itself was bordered with Red Gum, Black Box and Coolibah, with Tea-tree *(Melaleuca sp.?)* making a thick scrub in amongst the channels in many places.

We pull into the bank of the river for lunch and note many birds, conspicuous amongst which were Jacky Winters, *Microeca fascinans;* Harmonious Thrushes, Grey-crowned Babblers, Yellow-throated Friar Birds, Greenies, Sulphur-crested Cockatoos, Galahs, Cockatiels, Crimson-winged Par-

rots, White-winged Choughs, and Apostle Birds. Grallinas, Crested Bronzewings and Common Bronzewings were numerous, also Striated Pardalotes, and two being flushed from nesting holes in gate posts *en route*. After passing Wyandra, a wayside township on the railway line, we go on for about four miles before making camp for the night on the river bank. Boobook Owls and Owlet Nightjars are heard calling in the night, also, at intervals, the guttural gruntings and roarings of the Koala, *Phascolarctos cinereus*, were heard again after many years.

We are all up early to investigate the bird life of the river, but found nothing new. Fairy Martins are nesting in small colonies along the steep banks. Sulphur-crested Cockatoos scream amongst the trees, garrulous Miners scold us for our intrusion, and the fine mellow notes of the Pied Butcher Bird and of the Harmonious Thrush are distant and near. We are away early, pick up the road, and find it very rough owing to cattle having been over it in wet weather. In open forest many fine Bloodwoods are in flower, the foliage being covered with their corymbs of large creamy-white flowers. The stem and branches are covered with a rough, grey, scaly bark, the uppermost smaller branches only being smooth. The Yapunyahs, *E. ochrophloia*, have their butts black, the bark coming off in flakes, all the rest of the stem and branches being smooth or flesh-coloured or white. The Coolibah have grey, scaly stems, the upper branches being smooth and white. The Bimble Box has its branches grey and rough, with rounded glossy leaves. *Eremophila Mitchelli* is, in places, in blossom, which is white, and *E. maculata* is also in flower. More trees and shrubs appear as we near Charleville, and soon we find ourselves in an Ironbark, *Eucalyptus melanophloia* scrub, the trees varying in trunk diameter from 1 to 1½ feet; leaves silvery, and bark rugged and black. We hurry on to reach Charleville before the stores close, as it is Saturday, passing many shrubs that are new to us. On the outskirts of the town we find a lot of tall, graceful Eucalypts, which we afterwards find to be Moreton Bay Ashes, *Eucalyptus tesselaris*, at the western limit of its range.

Charleville is a large and well-built town, nearly all the houses being raised up on piles 6 or 7 feet from the ground, with inverted, tin-dish-like courses to cap them as a protection from white ants and other vermin. The most resistant wood to decay, and white ants, is Gidgee, next to which comes Pine, so long as it lasts impregnated with its natural oils and

resins. Wherever the Pine grows it is being cut for fencing and building purposes, and the forests of it are being gradually cut out, and there is no reproduction.

In Charleville we make a few inquiries as to a likely camping place, make a few additions to the commissariat, and retrace our steps to the Warrego over the week-end. We reach the Ironbark scrub again in time for lunch, and add a few specimens to our plant portfolios. A small and graceful Wattle is coming into flower, *Acacia patens*, which proves to be a new record for the State that we are in. *Indigofolia brevidens* is an old friend met with at the Depot Glen of Sturt A shrubby Grevillea, with trifoliate leaves and dry seed vessels, is new to us. A tall, scraggy Aster, *Olearia subspicata*, is flowering, but not nearly so finely as *O. pimeleoides* was at Wanaaring. A rough, tussocky grass, *Triodia Mitchelli*, has been eaten down by cattle, but the few green leaves that are left exale a perfume that scents the whole atmosphere of the scrub in an agreeable way. It should be possible to distil a fine essential oil from this plant. *Velleya paradoxa*, *Helipterum polygalifolium* and a Lavender Daisy are growing amongst these plants. Two pretty shrubs are *Phebalium glandulosum* and *Claythrix longiflora*, the latter in flower. We go and camp on a waterhole on the river, choosing a soft, dry, sandy spot for our poor hips. During the night many calls of the Boobook are heard from different quarters, and also of the Koala.

Our driver directed my attention to a crested bird in one of the creek Gums, which proved to be an Eastern Shrike Tit, *Falcunculus frontatus*, the first that I had seen for a long time. This must be about the western limit of its distribution in Queensland. There was a pair, and busy, as usual, pulling bark off in search for breakfast. A Square-tailed Kite was starting a nest on the horizontal fork of a Coolibah by our camp, and we could watch her frantic efforts and admire her patience in trying to fix dry branchlets on a slippery horizontal fork. The branchlets were all snatched from the top of a neighbouring tree by flying sweeps with the bird's claws carried in them to the chosen site, transferred to the beak before alighting, and then placed in position, the outspread wings being used to prevent slipping as much as possible, but in spite of all this most of the twigs found the ground from which she never retrieved them, more being obtained from the tree tops. At this camp both Ground Cuckoo Shrikes, *Pteropodocys maxima*, and the Little Cuckoo

Shrikes, *Grauculus robustus*, were seen, and I tried to follow up the melancholy call of a Bronzewing till it led me to a dense Tea-tree patch, with about 30 yards of water to cross, when I decide to leave the bird to its misery.

After breakfast Dr. Chenery and I went up the creek for a while, crossed where a dead *Tiliqua scincoides* was attracting numbers of flies to its dissolution. We also went up on the other side on the look out for the long-lost *Sericornis tryannula*, then out into the timber Yapunyah, Gidgee, Mulga, and *Eremophila Mitchelli*, on the last of which a Loranth, *L. Murrayi*, new to us, is growing. *L. pendulus* is common on Gidgee and Mulga, and a red and yellow leafed one, like *L. miraculosus*, but not in flower or fruit, on Yapunyah. The same Friar Birds are about, and we admire the droll attitude struck by *P. cornicalatus* when uttering its rollicking notes, and it does not require a big stretch of imagination to picture him in an ancient monastery with a flagon of nut-brown ale at hand, head and bald pate rolling back to give forth a jovial song. Peaceful Doves are plentiful, and Jacky Winters and Brown Tree Creepers common. We soon come to the gravelly divide, on which there is quite a thick growth of *Dodonaea boroniaefolia*, with *Eremophila Mitchelli* and *Cassia artemisioides*, occasional trees of *Eremophila longifolia* and bushes of *Eremophila maculata*. There is a good deal of dead timber on the ground, and small birds are plentiful, such as *Acanthiza nana*, *A. uropygialis* and *Geobasileus chrysorrhous*. We find a nest, of the last 6 feet up, in a *Eremophila Mitchelli*, containing three eggs, with one of the Narrow-billed Bronze Cuckoo. *Climacterus superciliosus* and *Sitella chrysoptera* were policing the trunks and branches of the larger trees. The Grey Fantail, *R. flabellifera*, and Willie Wagtail, *R. leucophrys*, were busy about the scrub and tree tops. The Brown Honeyeater, *Stigmatops indistincta*, was very lively in its movements, and a fine singer, many of its notes recalling those of the Reed Warbler, *Acrocephalus australis*. Many Apostle Birds disported themselves in groups. Red-capped Robins and Rufous-breasted Whistlers were frequent, and on our way home along the river we saw several specimens of the Little Cuckoo Shrike, *G. robustus*.

At about 4 p.m. Dr. Chenery and I crossed the river and went straight out into the open forest of Pines, *Callitris robusta;* Mulga, *A. aneura*, and fine tall specimens of the Moreton Bay Ash, *E. tesselaris*, in one of which, at a considerable height, a Whistling Eagle had her nest. We note

Crimson-wing and Ring-neck Parrots, noisy Miners, Friar Birds, Jacky Winters, Willie Wagtails and Greenies, numerous as elsewhere. A pair of little Thornbills, *A. nana*, are building in an *Eremophila Mitchelli* at about 8 feet from the ground, and an Orange-winged Treerunner, high up on a dry branch of a Moreton Bay Ash. Kookaburras and Frogmouths are also seen on our way back to camp. At night a Boobook keeps calling from a tree over our camp in the light of the partially-eclipsed moon. These birds seem to be plentiful along the Warrego, and we are struck by the individual variation of their notes. Away from the breeding season their boobook call is rarely heard, being replaced by a single note-hough.

Monday, August 22, we make an early start back to Charleville, but soon pull up at the area of open forest where the ground is covered with flowering bushes of *Eremophila maculata*, the large timber being Bimble Box, Ironwood, Gidgee and Mulga, amongst which are a group of tall flowering Wattles, *A. harpophylla*, with falcate whitish leaves and a very rough dark bark. Birds, mostly attracted by the flowers of the Eremophila, were plentiful—the Yellow-throated and common Friar Birds, Miners, Greenies, Blue-faced Honeyeater, *E. cyanotis;* Brown Honeyeaters and Spiny-cheeked Honeyeaters, also a few Spotted Bower Birds Restless Flycatchers and Jacky Winters.

On the road we pick up Mr. Riddell, who had gone on to take a group of trees consisting of Mulga, Currajong, Needle Bush, Moreton Bay Ash, Bimble Box and Yapunyah.

In Charleville we look up a few people and are advised by all to go out to the Ambathala Waterhole, on the Adavale road, about 70 miles west, as the hole is always kept full from a bore stream. Leaving the town we pass through some fine Moreton Bay Ash trees, Ironwood, Gidgee and Bimble Box; then leaving the larger trees we pass alternately tracts of Mulga and Gidgee scrub, with Bimble Box as the common large tree, Yapunyah coming next. We pulled up for a late lunch in a patch of Mulga. The ground is dry and the herbage scanty, due to the season's rainfall having been patchy. We start again soon, and come to the gravelly ridge which marks the divide between the Warrego and Paroo, covered with the same scrub as before, of *Dodonaea boroniaefolia* and *Eremophila Mitchelli*. The Langlo River is crossed, and we have to keep going to reach our camping place for the night, which we do just before nightfall. We find the long

waterhole full, and covered with weeds. The country surrounding it seems to be very dry, and not to have had any rain for some time. The hole is bordered with a good growth of young Red Gums, the old timber all having been cut out. *Acacia stenophylla*, *Eremophila bignoniaefolia*, and occasional trees of *E. longifolia*. Back from the waterhole was a bordering scrub of *Myoporum deserti*, in flower, with scattered specimens of Bimble Box; and beyond this thick Gidgee scrub. This Dr. Chenery and I decide to explore on the following morning. It turned out to be very dry, the ground being bare of vegetation or covered with dead leaves, and birds not plentiful. Ring-necked Parrots were seen, Spiny-cheeked Honeyeaters, Greenies and a few Brown Honeyeaters, Chestnut Tail and Little Thorn Bills, and two families of Black-backed Wrens, *M. melanotus;* Orange-wing Sittelas and White-browed Tree Creepers, Rufous-breasted Whistlers, Grey Thrush and Crested Bell Bird and Red-capped Robins. We decided that we had better go on towards Adavale and pack up and get on our way, calling first at the station, and then picking up the road that leads for some distance through thick Gidgee scrub, then Mulga and Bimble Box. It is all very dry until we begin to climb up the divide between the Paroo and Bulloo, rocky ironstone country. We stop at a gully in the range to examine it; it is moist at first for a small distance, and the scrub thick with many traces of Wallaby. The Mulga and Gidgee are very thick, with an underbush of *Eremophila latrobei* and *E. Bowmani*. *Solanum ferocissimum* and the fern *Cheilanthes tenuifolia* grow in the moister parts of the gully, with a Lavender Daisy and the large Yellow Everlasting, *Helichrysum lucidum*. Further in we come upon groups of *Eucalytus Morrisi*, and a fine Tecoma growing up over the Mallee and Mulga. This proves to be *T. Oxleyi*, differing in leaf and flower from *T. australis*, as I have found it flowering on Mt. Manara. We see very few birds, and resume our journey over the range. On the crest we find a small-leafed shrub in full flower, *Thryptomene oligandra*, making a beautiful object. Associated with this is a great amount of *Eremophila Bowmani*, also flowering freely. A fine tall Eucalypt, with clean white trunk and branches and small bright green lanceolate leaves, *E. Thozetiana*, is much admired. It grows freely in the gullies of this range, and thins out as we proceed westward, Adavale seeming to be the limit of its range in that direction.

(To be continued.)

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— OF —

The Field Naturalists' Club of Victoria

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Hon. Editor: F. G. A. BARNARD, Esq

The Author of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING.

MONDAY EVENING, 10th NOVEMBER, 1924.

1. Correspondence and Reports.
2. Election of Members.

	PROPOSER	SECONDER
AS COUNTRY MEMBER— Rev. George Cox, "Gunyah," Mornington.	Mr. F. Chapman, A.L.S.	Mr. C. Oke.

3. Nominations for Membership.
4. General Business.
5. Remarks by Exhibitors relative to their Specimens.
   Ten minutes' adjournment for discussion of Exhibits.
6. Reading of Paper and Discussion thereon.
   1. By Mr. J. H. Harvey, F.R.V.I.A.—"From Brisbane to Maitland, N.S.W., via Tweed Heads and North Coast Railway." With lantern illustrations.
   2. By Mr. J. C. Goudie—"Notes on the Coleoptera of North-Western Victoria," part 12.

   The committee will be pleased to receive promises of papers for future meetings.
7. Reading of Natural History Notes.
   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same, that he may arrange for their bringing them before the meeting; such notices should, however, be brief.
8. Exhibition of Specimens and Conversazione.
   Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Club year ended on 30th April last. Any subscriptions overdue should be forwarded to the Hon. Treasurer at once.
Subscriptions for the year 1924-5 became due on 1st May.

SPECIAL NOTICE.—The attention of members is directed to item 8 of business paper. Notices of exhibits should, if possible, be type-written.

WILD FLOWER SHOW.

Members who had tickets for sale are requested to account for them at the monthly meeting.

LIBRARY.

The Hon. Librarian desires that all books and magazines belonging to the Club be returned at the November meeting, to facilitate the re-arranging of the Library.

The Victorian Naturalist

Vol. XLI.—No. 7. NOVEMBER 6, 1924. No. 491

FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, October 13, 1924.

The President, Mr. J. Searle, occupied the chair, and about fifty members and visitors were present.

CORRESPONDENCE.

From Miss R. Chisholm, B.A., saying good-bye to Club members on account of her departure for Canada, where she will take a course in Domestic Science at Toronto prior to taking up the position of Principal of the McPherson School of Domestic Economy, Melbourne.

On the motion of Messrs. C. Oke and H. B. Williamson, F.L.S., it was resolved that a letter of congratulation be forwarded to Miss Chisholm on her appointment, and on the motion of Messrs. F. G. A. Barnard and F. Pitcher, it was decided that a letter of introduction to similar societies in Canada be given to Miss Chisholm.

DEATH OF MEMBER.

The President referred to the unexpected death of Mr. Leonard B. Thorn, a member of the Committee, who passed away after a short illness on the 3rd ult. He moved that a letter of sympathy be forwarded to his relatives. The motion was carried in silence, all standing. Messrs. C. Oke, H. B. Williamson, F.L.S., and F. E. Wilson, F.E.S., spoke of the devotion of the late Mr. Thorn to the study of lepidoptera, and the loss to the Club by the death of such an enthusiastic member.

REPORTS.

A report of the excursion to Greensborough on Saturday, September 13, was forwarded by the leader, Mr. A. J. Tadgell, who reported a good attendance of members. The day was very pleasant, and the green, undulating countryside made the outing most enjoyable. About one hundred and thirty plants were identified, of which fifty-six were found in flower. Eleven orchids were recorded, while the aliens numbered thirty-eight. The four forms, recognised by Robert Brown, of the liliaceous plant, *Anguillaria dioica*, R.Br., "Early Nancy," were pointed out. Lovers of colour were attracted by the delicate blue of the "Love Creeper" familiar to collectors as *Comesperma volubile*, but recently changed under the law of

priority to *Bredemeyera volubile*. A few birds, such as the Grey Thrush, Pardalote, and two species of cuckoos were identified by Mr. Chas. Barrett, C.M.Z.S. From the high bank of the Plenty River a good example of a meander could be seen, with its erosive influence, and Prof. J. W. Gregory's conclusion was recalled that the Plenty, instead of joining the Yarra near Eltham, as it does now, at one time flowed more southerly, and joined other rivers off Portarlington, on the plain or valley whose bed is now occupied by Hobson's Bay and Port Phillip.

A report of the excursion to Ringwood on Saturday, September 20, was given by Mr. J. W. Audas, F.L.S., who reported a fair attendance of members. The railway enclosure was followed for a couple of miles towards Bayswater, where a turn towards Vermont was made, and a belt of scrub searched for wild flowers, with good results, some fifty species, including thirteen orchids, being found in bloom. The list included a number of interesting species, such as *Bredemeyera comosperma, B. cricinum, Sphærolobium vimineum, Utricularia dichotoma, Polypompholyx tenella, Phlyoglossum Drummondii, Euphrasia collina, Hovea heterophylla, Indigofera Australis, Kennedya prostrata, Acacia stricta, A. tenuifolia, and A. myrtifolia. Pultenæa Gunii and Hibbertia stricta* were aflame with colour and very abundant. The climbers *Hardenbergia monophylla* and *Bredemeyera volubile* were seen at their best.

A report of the excursion to Hurstbridge on Show Day, September 25, was forwarded by the leader, Mr. A. J. Tadgell, who reported a pleasant outing, the rain of the previous day having freshened the paddocks considerably. About one hundred and fifty plants were identified, of which ninety were in flower. Thirty aliens were among those listed. Some physiological points were demonstrated during the walk, such as the different bushes bearing the male and female flowers of the Prickly Currant bush, *Coprosma Billardieri*. The curious little fern-like plant, *Ophioglossum coriaceum*, attracted some attention. This is usually found in a damp depression, but here it was growing on a hillside. The Golddust Acacia, *A. acinacea*, was at its best, and seemed to well deserve its vernacular name. The party had been indebted to Mr. A. L. Scott for some remarks on the geology of the district, and to Mr. J. R. Leslie for the identification of a number of mosses and other cryptogams.

A report of the excursion to Bendigo on Saturday, October 4, was given by the town leader, Mr. C. Daley, F.L.S., who said that the seventh annual excursion to that district had been

successfully carried out by a small party, which left town by an early train on the Saturday, and returned on Monday. The date was found to be rather late to see many of the characteristic flowers at their best, but enjoyable outings were made to Peiper's Hill, in the vicinity of One Tree Hill, and to Big Hill, near the Melbourne road. Eighteen plants were added to the list of Bendigo plants recorded on these excursions.

A report of the excursion from Wandin to Evelyn on Saturday, October 11, was given by the leader, Mr. H. B. Williamson, F.L.S., who said that, notwithstanding heavy rain, a small party managed to carry out this excursion, covering a distance of about five miles. Only three common orchids were seen. The most interesting plant collected was *Pultenæa Weindorferi*, Reader.. This shrubby plant was originally described in the *Naturalist* of July, 1905 (Vol. XXII, p. 51), by the late Mr. F. M. Reader, from specimens collected by Mr. G. Weindorfer on some swampy land near the Warburton road at Wandin. Recently it has been gathered by Dr. Sutton, and Mr. J. W. Audas, F.L.S., near Gembrook, and specimens, without the collector's name, are in the National Herbarium, marked "Dandenong Ranges." For this and *P. juniperina*, a week or two later would perhaps yield better specimens. The principal members of the bush vegetation seen in flower were the Snow Daisy-bush, Golden Bush-pea, Yellow Riceflower. Other plants noted were the Spoon Riceflower, Alpine Grevillea and Heath Milkwort. The Narrow-leaf Acacia and Myrtle Acacia were past their best.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Mary I. Allfrey, 6 Kensington Road, South Yarra, and Mr. F. E. Grieve, M.A., Wesley College, Prahran, were duly elected as ordinary members, and Mr. K. F. Hatfield, "Talgai," Lilydale, as a country member of the Club.

GENERAL BUSINESS.

Attention was called to the Annual Exhibition of Wild Flowers to be held on Tuesday, 21st inst., and some time was spent in arranging details, in consequence of which it was decided to postpone the reading of the paper by Mr. J. H. Harvey, F.R.V.I.A., until next meeting.

NATURAL HISTORY NOTES.

Mr. A. E. Rodda read some notes on the Eastern Water-dragon Lizard, in illustration of his exhibit of photographs of this lizard.

Mr. C. Oke gave an account of the peculiar attraction the scent of the Wood Ant, *Iridomyrmex nitidus*, seems to have for cats.

EXHIBITS.

By Mr. C. Daley, B.A.—Large specimen of Gypsum from Northern Queensland; also fading blooms of the following plants grown at Caulfield: *Micromyrtus ciliatus*, *Calytrix Sullivani*, *Calytrix tetragona*, and *Thrytomene Mitchelliana*, all having a brown to reddish tinge before fruiting.

Mr. C. French.—Double flowers of Fairy Wax-flower, *Eriostemon oboralis*. This form is very rare.

Mrs. Mattingley.—Some photographs of New Guinea natives, etc., Papuan axe-head, Wood-carving by Papuans, bean of Cascara tree.

Rev. A. J. Maher.—Specimen of Common Spider Orchid, *Caladenia Patersonii*, two feet high, with three large flowers.

Mr. A. E. Rodda.—Photographs of Eastern Water-dragon Lizard, from Aberfeldy River, Gippsland. Also two other species of same group.

Mr. A. L. Scott.—Fossils from Wandong Quarry.

Mr. J. Searle.—Large fossil tooth.

Mr. H. B. Williamson, F.L.S.—"Fibre-ball" from South Australian coast. Flowers from Wandin excursion.

After the usual conversazione the meeting closed.

EXHIBITION OF WILD FLOWERS.

The Annual Exhibition of Wild Flowers was held at the Melbourne Town Hall on Tuesday, October 21, when there was again a good attendance of the general public. The display of flowers was very good, but it has not been possible to complete the full list of exhibitors, etc., in time for the present *Naturalist*. From returns to hand it is expected that about £50 will be available for the Bush Nursing Association, as its share of the proceeds.

The Late Mr. Leonard B. Thorn.—Attracted by Mr. F. P. Dodd's fine exhibition of Queensland and New Guinea butterflies in Melbourne in 1918, the late Mr. L. B. Thorn took up the study of butterflies and moths, and in August of that year became a member of the Field Naturalists' Club. The life histories of the largest members of the group being fairly well known, he devoted himself to the smaller species, and chose the Lycænidæ for special attention. This family is particularly difficult to investigate, as the larvæ of many of the species are night-feeders, and in some cases the attendance of ants

seems to be necessary for their arrival at maturity. The results of some of his observations were published in the *Naturalist* for July last. In September, 1922, he joined Mr. G. A. Waterhouse, F.E.S., of Sydney, and Mr. A. N. Burns, of Brisbane, both members of this Club, in a collecting trip to the Richmond River district, N.S.W., and on to Southern Queensland, in search of certain species of butterflies required for special investigation, and in November of last year, in conjunction with Mr. Burns, gave an interesting account of the trip before this Club (*Vict. Nat.*, March, 1924, XL, p. 221), illustrated by a plate of some of the rarer species collected. He was an adept at setting and displaying his specimens, and was always glad to give information to others regarding the subject. During recent years he had acted as leader of several club excursions, and his name appears in the current programme in a similar capacity. His illness is thought to have been occasioned by too strenuous attention to his hobby, in addition to his every-day life, and his death on October 3, at the early age of thirty-three, leaves a blank in the Club's workers which will be hard to fill. At the last annual meeting he was elected a member of the Committee, and exhibited considerable enthusiasm in that position. It was during the journey to Bendigo that some of his friends learned the sad news, and as Mr. Thorn had frequently joined in that excursion, his fellow-members felt the loss very keenly.

The Late Mr. George R. Hill.—By the death of Mr. G. R. Hill, on the 19th ult., the Field Naturalists' Club has lost one of its oldest supporters, he having been elected a member in January, 1884. Though we believe he was not an actual collector of natural history objects, he encouraged his sons to devote their attention to the life around them. He was a draughtsman by profession, and served the Victorian Railways faithfully for many years, retiring after holding the position of chief draughtsman for twelve years in November, 1894. He acted as a member of the Committee of the Club in 1893-94 and 1894-95. At this time prizes were offered to juniors for collections of natural history objects, and it is pleasing to record that two of his sons secured prizes in these competitions. One afterwards adopted entomology as his life-work, and some two years ago succeeded the late Mr. F. P. Spry as entomologist at the National Museum, Melbourne. Mr. Hill was born in Bristol, England, in 1838, and had reached the ripe age of eighty-six at the time of his death. He left a widow and a family of eight sons.

AN EXCURSION IN SOUTH-WEST QUEENSLAND.

By Dr. W. MacGillivray, Broken Hill.

(*Read before the Field Naturalists' Club of Victoria, 11th August and 8th September, 1924.*)

(Continued from page 120.)

In a gully to the north of the road there is much under-scrub of *Eremophila Bowmani*, *Cassia Eremophila* and *Indigofera brvidens*, with the *Tecoma Oxleyi* climbing over the trees in masses. The scrub itself is mostly Mulga, *Eremophila Mitchelli*; Wild Lemon, *Canthium oleifolium*, with *Eucalyptus Morrisii*, *E. ochrophloia*, *E. populifolia* and *E. Thozetiana* scattered through it. Returning to the road we climb to the top of the range over a rough road, and find *Dodonaea petiolaris* making a great show with its large bladder-like seed pods, of all shades of colour, from pale green to rich, ruddy brown. I recognise it as the one that I had previously found on the Nappa Merrie range, to the north of Cooper's Creek. To find a camping place we run down the western side of the range until we come to a creek crossing the road, which we explore up and down from the road for water; it is very bare, and most of the holes are nearly dry and much trampled with cattle. One, however, a little larger, serves our purposes, as we intend to return to the range early next morning.

We are up early, as the ground was very hard and burry, and we are soon back along the road until we regain the top of the range. We leave the car and climb down a steep, rocky bank on the north side, in which are small caves used by Wallabies for shelter. There are many tracks of these animals through the scrub. The underscrub consists of *Eremophila oppositifolia*, *E. alternifolia*, *Cassia eremophila*, and *C. artemisioides*, with Wilga, Mulga and *Eremophila Mitchelli* up to 20 feet in height. The larger timber trees are mostly the Eucalypts already mentioned. Birds are not numerous; *Acanthiza nana* and *A. uropygialis*, *Petroica goodenovii*, *Rhipidura albiscapa*, *Collyriocincla harmonica*, *Acanthagenys rufogularis*, and *Pomatorhinus temporalis* are seen. On the top of the range bordering the road is a stunted scrub of *Acacia doratoxylon*, and to the south of the road one looks over a sea of scrub interspersed with the larger trees previously mentioned, stretching away for miles. Our driver noted a bird crossing the road which proved to be a female of *Cinclosoma castanothorax*.

On resuming our journey towards Adavale we pass through scrub, mostly open Mulga, some of which are covered with the *Tecoma Oxleyi*, finely in flower. *Jasminum lineare* and *Marsdenia leichardtiana* are frequently seen climbing or supporting themselves on dead or living scrub trees. Many Bloodwoods are covered in blossom, and are fine large trees, very different from the stunted specimens one finds in the north-west of New South Wales, where the average rainfall is much less than here. We go along the road through the open scrub and note patches of *Cassia pleurocarpa*, or a nearly-allied species, along the road, flowering and growing to a height of 10 or 12 feet. We had previously met with it in small colonies near Charleville, and I had collected it on the sand hills near Fort Grey, in New South Wales, and also in South Australia, near Cordillo Downs Station.

Our road soon takes us into country which had been favoured with good winter rains, as the ground is covered with a carpet of herbage, much of which is in flower, the prevalent yellow colour being due to the *Velleya paradoxa*, an upright-growing form with golden-yellow flowers, and, to a lesser extent, to a procumbent form, *Goodenia glabra*. We stop with the idea of adding to our botanical specimens and boiling the billy for lunch. I was rather surprised to note a scrubby growth of *Petalostylis labicheoides* recovering and growing vigorously after having been burnt to the roots; with us at Broken Hill it grows high up on the slopes of Mt. Robe. A saltbush-like shrub, also growing beside the road, was in flower, and turned out to be a new species of *Prostanthera*. The purple-flowering *Eremophila Goodwini* was fairly frequent. When I found several species of the beautiful turquoise-blue Pincushion, *Brunonia australis*, in my ignorance I made sure that it must be something new, but found afterwards that Major Mitchell had collected it in 1836. Several composites were amongst the other flowers, *Helichrysum lucidum* being the most conspicuous, with the soft Billy Button, *Craspedia Pleiocephala*, in greater number. Two species of Trichinum were present, one with beautiful rose-pink flowering heads, *T. calostachyum*; the other taller, more conspicuous, with silver-white heads, *T. macrocephalum*. *Podolepis rutidochlamys*, a tall thistle-like plant, and *Linum marginale* reared their heads above all the others; *Loranthus pendulus*, the common parasite of the Mulgas.

Resuming our journey, we pass through this class of country for several miles, till near Adavale, when we come to land which had been bared by travelling mobs of cattle, only a few scattered Gums, mostly Yapunyah, Bimble Box and the white-stemmed *E. Thozetiana,* being left to grace the landscape. We cross the Blackwater Creek, running with bore water, before coming to Adavale, a small township on a bare, open space. From here it is our intention to follow the Bulloo down to Thargomindah, and so get our directions, and make off across the common, on the western road, for several miles, till we come to the Bulloo, which we cross before leaving the main western, or Windorah, road to turn south. The Bulloo consists of a wide bed, in which are a number of channels. Most of the holes are full, and some are fine large and deep ones, bordered by Red Gum, *E. rostrata;* Coolibah, *E. microtheca;* *Acacia stenophylla* and *Eremophila bignoniaeflora* Much rank grass grew in between the channels, mostly Mitchell and Kangaroo grass; the latter, in large tussocks, served to shelter numbers of Wallabies. Our road follows the path of least resistance, down the river on the flooded ground or out into the scrub to cut off a bend. We cross and recross the channel several times before coming to Thargomindah. Our first crossing was 15 miles from Adavale, and we go a few miles to camp in the channel at a good waterhole.

On the following day we decide to let our driver take the car on and wait for us at the next crossing for lunch, whilst Dr. Chenery, Mr. Riddell and I walked the river. It turned out to be a long fifteen miles, and three very weary and hungry men reached the crossing well on in the afternoon. We found the vegetation along the channel very dry, and birds remarkably scarce. A few Pelicans, Cormorants and Spoon Bills frequented the holes. Ducks were few in number. Only two Sulphur-crested Cockatoos and one Galah were noted, and no Parrots. A dry time had sent most of the birds elsewhere. Four birds were found nesting—a Jacky Winter, a Spiny-cheeked Honeyeater, a Diamond Dove, and White-browed Swallow.

We go, after lunch, for about ten miles, till we come to a stony hillside, which is gay with wildflowers, *Velleya paradoxa* and *Helipterum floribundum* preponderating. This hillside was productive of two new species—a pretty pink Gomphrena and an Isotropis—a fine brown perennial pea. *Canthium oleifolium* is here of better growth, and much bushier than on the Warrego. The pretty little Climbing

Pea, *Glycine clandestina*, is frequent. Leopard Trees are again a feature of the landscape; other trees are Bloodwood, Whitewood, Mulga and Dead Finish. The Wedge Bill is heard again, and a solitary pair of Red-rumped Parrots seen just before dark. We pass Comongin Station, quite a town of buildings on the shore of a fine sheet of water; Lake Dartmouth, on which are numbers of Waterfowl. We go on to camp within a few miles on a small waterhole.

Early next morning we hear the Brolgas calling, and see four Banksian Black Cockatoos alight on a Leopard Tree near the camp. Quilpie—we enter on the last day of August—is the western terminus of the Brisbane-Charleville railway, an unpretentious township on bare, open country. After making a few purchases we leave the town again. A flock of twenty-seven Black Cockatoos, *C. Banksii*, fly overhead before we leave, and twelve Brolgas are seen on the outskirts. We are unfortunate in breaking a back spring when only two miles out, so we decide to unload under the nearest Gidgee for our driver to take the trolly back to the local blacksmith whilst we set ourselves to explore the country. The country is very dry, and birds and plants are scarce. A party of Apostle Birds, *Strathidea cinerea*, are busy about a nest high up on a vertical fork of a Yapunyah, going into the nest by turns and doing a lot of chattering. About a hundred yards further on another lot were noticed about a nest, only 15 feet up, in a Gidgee. This nest was a new one, well built up, lined with grass, and contained six eggs. These birds are usually found in small communities, and when a nest is to be built all take a part in it, carrying either mud or vegetable fibre, and waiting their turn to add their quota. Several are often seen fussing about a nest and taking turns to sit on the eggs.

Making another start along the road, we soon pull up to photograph a finely-flowering specimen of the lignum-like *Eremophila Polyclada*, which was covered with its white flowers. Two Prickly Climbers we do not find in fruit or flower, although we have seen them alongside the road at intervals since we arrived at Cunamulla, and are unable to identify them. The principal scrub tree is still the Gidgee, with Yapunyah, Bimble Box and Bloodwood here and there amongst it. Along the watercourses, with its grey-green foliage at times assuming almost a purplish hue, *Eucalyptus microtheca*, commonly known as Coolibah, *E. rostrata*, a darker green in colour, contrasts with it, and is not so frequent as it was on the Bulloo. *Cassia artemisioides* is more common

now than *C. eremophila*, and many bushes are flowering. *Cassia phyllodinea* forms low bushes, and *Cassia desolata* is often associated with it on stony ground, and sometimes a small-leafed form, *C. Sturtii*. The Wild Parsnip is flowering freely, but the Carrot is only in bud; the flowers of the former, a pale mauve in colour, cover whole hillsides in places. We cross the Bulloo twenty-eight miles from Quilpie, and camp for the night. All through our trip mosquitoes have only troubled us for an hour or so at sunset, disappearing after nightfall when the temperature dropped.

There were very few birds about this camp, Crested Pigeons, Peaceful Doves, Grecnies, Spiny-cheeked Honeyeaters, White-browed Wood Swallows, Red-backed Kingfishers and Kookaburras. We have not seen any Blue Bonnets since leaving Cunamullah, no little Corellas since Bootra Station, in New South Wales, and no Ring Necks since Charleville. Our first stop on the road is to investigate a patch of Gidgee to the left of the track, near to which about twenty Strawnecked Ibis are feeding in the open on caterpillars, and a fine pair of Wedge-tailed Eagles are breakfasting on a dead bullock.

Now that we are getting away from thick scrub *Anthus australis* is becoming more frequent by the roadside. The patch of scrub, being dry, contained very few birds—Chestnut-backed Thornbills, Red-capped Robins and White-browed Babblers. It opens out into scrub of taller growth, in which we find a party of Apostle Birds fooling about a nest which contains three eggs, which they all take in turns to sit on for a few minutes at a time. We return to our car and go on through country that has been eaten bare by travelling cattle, as we are following a main stock route. Twenty Whistling Eagles are counted as they rise from a patch of green, where they have been regaling themselves on caterpillars, and getting efficient help from White-Browed and Masked Wood Swallows. Lunch time is spent on a bore stream, and is hurried through, as the place is infested with sand flies.

The rest of the road is uneventful, and we run into Thargomindah about sunset—a dead town, owing to the surrounding stations carrying few, if any, stock, and consequent depopulation of the country. Most of the houses are empty or in a state of dilapidation and decay; paint has been a stranger to them for many years. The street—there is but one—is lit by electricity, but the lamps are so covered with cobwebs that they only give a dim light. The light is generated at a fine artesian bore about three-quarters of a mile

PLATE V.

CAPER TREE (in fruit), *Capparis Mitchelli,* LIND.

DARLING LILY, *Crinum flaccidum,* HERB.

from the town, the bore water being laid on all over the town. This bore has been running for thirty years; it has a depth of 2650 feet and a daily flow of 670,000 gallons, and comes out of the pipe at a temperature of 160 Fahr. Its chief constituent is sodium carbonate, and it is quite a good water for all domestic purposes, and should combat the effect of acidosis and any tendency to *arterio sclerosis* in the inhabitants.

We left "Thargo," as it is affectionately called by the locals, after lunch on September 2, taking the road to the Wilson River, passing through open country lightly timbered with Bloodwood, Beefwood, Needlewood, Dead Finish and Mulga, till we turn in to the left, at fourteen miles, to camp on the margin of the Bullawarra Swamp. This swamp surrounds Bullawarra Lake, which is about five miles in diameter, a sandhill separating them, except where a feeding water course runs through. In the swamp is much Lignum, *Muhlenbeckia Cunninghami*, and Coolibah, *E. microtheca*, with *Acacia stenophylla*. Bordering the lake one finds mostly Red Gum, *E. rostrata*; Coolibah and *Acacia stenophylla* again. When I waded into the swamp a few Waterhens, *Tribonyx ventralis*, flushed from the Lignum, in which were their old nests, and also a pair of Red-kneed Dotterel. I crossed to the sand ridge to examine the lake, which was open water without any birds on it as far as one could see. A few Maned Geese and Grey Duck were amongst the bordering timber, in which Galahs were nesting freely. Mr. Riddell joined me, and we went on along the edge of the lake. From a large, open hollow a Winking Owl was flushed; the hollow was found to hold three downy young of this species. A Little Falcon came across the lake to one of the trees near us, and as we return to camp a pair of Spur-winged Plovers keep vociferating overhead.

On the following morning Dr. Chenery and I made an early start through the swamp water, which is exceedingly cold, and we are glad to get on to a small island to stamp our feet into sensibility. We first look up the Winking Owl, and find the male roosting in an *Acacia stenophylla* near the nesting tree. The female flushes from the hollow, and they both fly up into the branches of an adjacent Red Gum, where they are immediately attacked by a pair of Little Falcons who give the poor Owls no peace, shifting them from tree to tree, and causing them to call out repeatedly. The Falcons probably had a nest in one of the old Whistling Eagles' or Kites' nests, which were numerous in the adjoining trees

From one hollow a Little Corella is flushed the first we had seen since leaving Bootra. We returned to the swamp, and waded through it for a few hours until it became too deep. Ducks were numerous, of several species; Grey Duck, Teal, White Eyed, Freckled, Pink Eared and Musk, Red-kneed Dotterel, were seen with young. Many young of the Black-tailed Water Hen, Reed Warblers and the Little Grass Bird were seen and heard, and *Malurus assimilis*. In the shallower parts were four Brolgas and several Yellow-billed Spoonbills. Waterfowl had evidently all nested and hatched their young, as we found many old nests in the Lignum.

We returned to camp for lunch, and before resuming our journey took specimens of a Saltbush, *Atriplex velutinella*, which proved to be a new record for Queensland. The road took us through openly-timbered country again, the principal trees being Bimble Box, *E. populifolia;* Beefwood, *Grevillea striata;* Mulga, *Acacia aneura;* with *Eremophila Sturti* and *Dodonaea viscosa* as shrubs. Grass was scanty and all herbage dry, except in depressions. This was succeeded by Gidgee and Mulga scrub. As we were leaving the swamp we saw strings and flocks of Straw-necked Ibis flying out from the back of the lake to feed on the plains which we are approaching, as the scrub is succeeded by open plains intersected by Gidgee creeks. Alongside the road we take specimens of an Eremophila, which is in flower and is growing in clumps, the bushes growing up to 12 feet in height, and many seem to be shooting up again after being eaten down by cattle. This species, *Eremophila Dalyana*, proved later to be another new record for Queensland. *Swainsona procumbens* was flowering freely in the moister places. *Helipterum floribundum* is dying off, and many of the plains are purple with the dry seed-vessels of a Lepidinar. A creek on our left is timbered with Gidgee and Coolibah, with fine flowering bushes of *Cassia eremophila*, occasional trees of *Acacia sentis* and *Acacia farnesiana*, the latter only in bud. Four Bustards are seen in the saltbush near the next creek on our right, where we stop to refill our radiator and water bag.

On the eastern slopes of the Grey Range the ground becomes very stony, and the scrub is mostly Gidgee. Acres of these slopes are covered with *Trichinium nobile*, and present a fine sight, and this continues over the top, which we cross where it is of low elevation, very rocky, and covered with stunted Gidgee scrub, with a few masses of *Sarcostemma Australe*. As we come down the western slopes to a bare, gravelly plain, two Gib-

ber Birds, *Ashbyia Lovensis*, are flushed, Anthus becomes more common, big flocks of Cockatoo Parrots pass us on their southward migration; but so far we have only seen one Budgerigar. We pull in to Stony Gidgee Creek, in which is a good waterhole to make camp for the night. The principal timber trees on this creek were Coolibah, *E. microtheca*, and Gidgee, *A. Cambagei*, with a few specimens of *A. salicina*. Bushes of *Eremophila bignoniaeflora* and Lignum, *Muehlenbeckia Cunninghami*, grow round the water's edge. Just where we camped this creek wound itself round the point of a very stony hill, which was covered with a very stunted scrub of Mulga and Gidgee, with *Eremophila oppositifolia*, *E. Dalyana* and *Scaevola spinescens* all in flower. On the top of the hill a Eucalypt attracted my attention by its pure white trunk and branches, light-green lanceolate leaves, and cupped seed vessels, placed singly at intervals along the terminal branchlets; it proved to be *E. papuana*, originally described from Port Moresby. It seems strange to me that a tree that flourishes in the humid tropical climate of New Guinea should be found on a dry, rocky range, bordering the desert area. *Dodonaea peliolaris* is also found growing amongst the stones on the banks of the creek, with *Trichinium obovatus* and also *Enchylaena tomentosa*. A White-winged Chough is sitting on her nest in a Gidgee near the camp, and a small mob of Apostle Birds are very much occupied in building a nest, taking it in turns to bring fibre and mud to the nest. A Sparrow Hawk's nest, found on the evening of our arrival to be empty, contains one egg on the following day. Dr. Chenery, by patient watching, found several nesting pairs within a few yards of one another; the first was *Climacteris supercilosus* feeding its young in a hole in a dead Gidgee. A Red-capped Robin, sitting on her well-camouflaged nest. A Yellow-tailed Thornbill and Dicaeum also had nests in amongst the leaves of Gidgees; the latter looked more like a tangled flocculus of cobweb than a nest, and could be easily overlooked. Two families of Purple-backed Wrens were disturbed on this creek within a mile of the camp. Greenies and Spiney-checked Honeyeaters were fairly plentiful, and breeding. Hooded and Red-capped Robins were seen in the scrub out on the hill.

On a bank of the creek the leafless Ballart, *Exocarpus aphylla*, scented the air with its small white flowers; here it grows as a miserably-stunted bush, far different to the fine bushes seen in the Mallee bordering the Murray, near Mil-

dura. On the second morning we pack up and resume our journey, now over stony plains intersected with creeks at intervals, and for the first few miles we have scrub on both sides, which we soon leave behind. *Eremophila Dalyana* made a low scrub bordering the road again for a time then more open stony plains, on which we disturb another pair of Gibber Birds, *Ashbyia Lovensis;* the plains are very dry and bare, and there is very little vegetation till we come to some sandhills running parallel to our road, and on our left groups of Whitewood trees grow on top, with *Acacia ligulata* in full bloom on the sides. The Yellow Pea, *Crotolaria dissitiflora*, is also finely covered with flowering spikes, and is a beautiful object, and was growing freely over the sand. The Green Pea, *Crotolaria Cunninghami*, were fewer in number in flower, but numbers of young plants were coming on. Some fine bushes of the Tangled Burr Daisy, *Calotis erinacea*, bright green in foliage and covered all over with orange-yellow flowers, would hold their own in any garden. Around the foot of the sandhills *Swainsona oligophylla* flowered in purple patches. Leaving the sandhills we pull on to ground subject to inundation from the Wilson River; this is very rough and covered with annual Salsolaceous herbage; we cross the river and gain the opposite bank. This river rises on the western slopes of the Grey Range, and runs south parallel with the range, then turns right round and runs north till it empties into the Cooper. From this junction north and east there is an area of Lignum country of about four thousand square miles, irrigated by the flood waters of the Cooper always once and often twice, or three times annually; this is a wonderful nursery for water birds, and may it long remain undisturbed by the gun of the sportsman.

We follow down the river until we come to Nockatunga Cattle Station, where the station buildings are on a stony rise overlooking a fine permanent waterhole, at the upper end of which there is a fine garden. We remain for two days, and then go down the river to Nocundra, a small township consisting of a police station, store, public house and a few houses. Here we recross the river and follow a car track in order to dodge a lot of rough going on the main one, caused by mobs of travelling cattle having been over it in wet weather. Our track leads us over stony ridges, clothed scantily in Mulga, Gidgee, Dead Finish, with occasional Bloodwoods, with underbushes of *Cassia phyllodinia, Cassia desolata* and *Eremophila Duttoni*, which are flowering. We flush an Australian

Dotterel from her well-hidden nest—a slight depression on a cart track, with a few hardened bits of clay about it. Fine groups of a Trichinum are passed by at intervals, and some photographs taken of them. Our track becomes too faint to follow, and we retrace our own tracks till we come to the old road, and go to cross the Twelve-Mile Creek, which is very gay with wild flowers, the colouring being mostly yellow owing to the dominance of *Senecio lautus*. Our car breaks down, and we carry our baggage for about half a mile to a waterhole, where we camp for the night. A few *Eucalyptus microtheca* and *Acacia stenophylla* border it, with *Eremophila bignoniaeflora* and the Lignum-like *E. polyclada*. A Purple-backed Wren has her nest and young in one of the last-named bushes. A Magpie, *Gymnorhina tibicen*, is feeding two large young in a tree by the camp. Numbers of Brolgas are out on the plain eating caterpillars. In the evening numbers of flocks of Ibis pass over our camp on their way to their roosting places, possibly on the flood waters of the Wilson.

On the following morning we see numbers of Brolgas quite near our camp, and very soon clouds of Ibis appear over the north-west horizon, first, as faint, nebulous masses, which soon materialise; many flocks flying over our camp and others going off to all points of the compass to feed on the harvest of caterpillars. These flocks, all of Straw-necked Ibis, must have represented an immense number of individuals, and they kept coming up from the one quarter in quick succession for an hour and a half before thinning out. The vegetation, nearly all herbage, is very good about this waterhole. We make an early start, and soon note a Mirafra, with fledged young. We examine a sandhill by the way; on it are many traces of the by-gone aboriginal inhabitants in the shape of old fireplaces and flint chippings. *Acacia ligulata* is flowering, and *A. Oswaldi* in bud only. Dead Finish is flowering well. Mulga, Whitewood, Needlewood, *Hakea leucoptera*; Cork Bark, *H. intermedia*; *Eremophila Duttoni* in flower, with bunches of green leaves, in which are the dark-red flowers, and *E. latrobei*, with brighter flowers and narrower leaves. At the foot of the sandhill I am very pleased to find a group of *Eremophila*, which I had previously seen on the stony country bordering the Cooper, and also growing freely at Cordillo Downs, from which place I brought specimens, but without flowers or fruit. I searched through my patch and found only one with a few flowers. These specimens, as the plant was first found in South Australia, were entrusted to

Mr. Black for description. *Trichinum alopecuroides*, with its purple or silvery-white tops, covers the ground in places. Singly one finds *Senecio gregorii*, *Swainsona lephrotrycha* and *S. oligophylla*, and a soft procumbent plant, *Gnephosis eriocarpa*, which is frequently used for lining birds' nests. A few stunted Bloodwoods, as the hill gets lower, and more stony, Mulgas become the domiannt tree. Across a stony plain a Gibber Bird, a company of Dotterel, and a pair of Black-breasted Plover are disturbed in succession.

A fine mirage is photographed away to our left, over a fertile plain, on which a number of cattle are grazing, with a bright-yellow carpeting of *Senecio lautus* in the foreground, and the Grey Range at the back. More car trouble enables two of us to look over part of the Eaglehawk Swamp, which stretches away to our left, recently dry but now gay with wild flowers, principally *Senecio lautus* and the little Yellow Lily, *Bulbine semibarbata*, the larger *B. balbosa* occurring in occasional plants. The pretty little *Mimulus gracilis* is also found here. There are very few birds, mostly Orange Tangs and White-winged Wrens. We cross several stony stretches between intersecting creeks, large areas being quite purple with *Blennodia canescens*. Gibber Birds, Australian Dotterel and Banded Plovers are passed, all paired and probably nesting. We pull up at Paddy Paddy Waterhole, and find the whole of the creek banks occupied by thousands of Straw-necked Ibis, and the air for a few moments is full of these birds, rising in alarm as the motor comes up to them. The road after this is very rough for a while, then better as we pass over stony plains, and towards evening we fill our canvas bucket and waterbag at a dam and seek a sheltered spot amongst Mulga, Whitewood and *Eremophila Duttoni*, on the edge of a sand ridge, for a night's camp.

An early morning ramble over the sandhill has much of interest; the sand, smoothed by the previous day's wind, is now covered with the tracks of creatures that come out at night, and early morning birds, and we find it an interesting pastime to track these to their ultimate destinations, or to guess at the purpose of their wanderings. The trees on the ridge are Mulga, Gidgee, Whitewood, and occasional Bloodwood and *Acacia cana* again. I flush an Owlet Nightjar from a hollow, and find Yellow-throated Miners, Crested Pigeons, Chestnut-eared Finches and Little Crows in fair numbers. The undersrub consists of *Cassia Sturti*, *C. desolata*, *C. phyllodinea* and *Eremophila Duttoni*. Resuming our journey over gravelly

plains, we flush two pairs of Gibber Birds before coming to two intersecting fences, compelling us to go through three gates to pick up the road again in "gibber" country, covered in annual saltbushes and other herbages, with Mitchell Grass, *Astrebla pectinata*, growing in the Gilgais. A fine Black Falcon is patrolling overhead on the look out for some unwary bird to rise into the air. Not far into this paddock we flush a pair of Gibber Birds, and soon find the nest, rather openly placed amongst the stones and herbage. Bush Larks are singing in the air high overhead, and it is not long before we come upon a Pratincole, with a small chick following her. This swallow-like Plover is a beautifully-graceful bird on the wing, and is also quite at home running over the gravelly plains which form its usual habitat. Gibber Birds are fairly plentiful, and a second nest, from which the female flutters away over the stones, feigning a crippled state, is found, placed openly as the first, and containing three eggs. Another Pratincole, on bare, stony ground, sets us a task to find her eggs, for nest there is hardly any, and the eggs are coloured like the stone.

Several more of these birds are seen before we leave the more open country and come to Bransby Station, but do not delay there, as we are anxious to reach Yanco Station before evening. Another gravelly plain is crossed before reaching the ruins of an old station on a creek; this we cross and go on to the next creek for lunch, where there is a good waterhole. Evidently, from the number of flint chippings and old fireplaces, it must have been a favourite camping place of the aboriginals. A Spiny-cheeked Honeyeater's nest is found in a Eucalyptus—an unusual place for this bird. A Sparrow Hawk is being harassed by those bullies of the bush, the Greenies. On the road again we pass over open country into open scrub, where the herbage improves, the whole roadside soon becoming a garden of wild flowers. Many trees of *Acacia cana* are bursting into bloom, the canary-yellow inflorescence being well set off by the silvery foliage. Dead Finish is flowering also, and the ground is in places white with *Helipterum floribundum*, or golden yellow, from the profusion of *Helipterum polygalifolium* and other yellow composites in lesser numbers. In thicker scrub there is a mixture of *Trichinum alopecuroides*, the thistle-like *Podolepis rutidochlamys*, the large lavender daisy, *Brachycome ciliaris*, *Senecio Gregorii*, in patches of brilliant yellow, or with downy, seeding heads. Amongst the underscrub, *Cassia Sturti*, *C.*

desolata and *Eremophila Duttoni* are all flowering and in fine foliage. We pull up at Little Dingera and have a cup of tea with the family, and are soon out again amongst the same garden of flowers till we reach Yanco Station, where we run into a party of drovers. About three miles beyond the station we camp at a billabong out from the Warri Warri Creek. Two of us walk over to the creek proper before dark to look up an old camping place, but find the waterhole much reduced in size from silting in the intervening years.

On the following morning we are all up early and on the road again, but pull up where wild flowers and birds appear to be numerous. Budgerigars are now arriving from the north in small flocks. Cockatoo Parrots are going over in larger numbers. Crested Bronzewings, Diamond Doves and Peaceful Doves and Bluebonnets are common. Chestnut crowned Babblers in the scrub, and White-browed along the creeks; Brown Tree Creepers amongst the creek timber, and the White-browed out in the scrub. Black-faced Wood Swallows—one pair had a nest containing four eggs in a Dead Finish; and the two migratory ones, the White-browed and the Masked, were all fairly plentiful. Singing, Black and Spiny-cheeked Honeyeaters are all busily engaged in domestic duties or hunting for their breakfasts. Mulga, Gidgee and *Acacia cana* are all in fine foliage, for semi desert species, and the ground is well covered with herbage. The Wild Parsnip, *Didiscus glaucifolius*, is one of the most conspicuous; tall, and covered with its mauve flowering heads, it overtops most other flowering plants. *Podolepsis rutidochalmys* is as tall; but, with only a small thistle-like flower, it is not nearly so conspicuous. *Helipterum polygalifolium* is the brightest of the "everlastings," but whole tracts of scrub are carpeted with the fine pale Heliotrope Daisy, *Brachycome ciliaris*, the flowers being unusually large. Two nests of the Chestnut-eared Finch are found, one in a pendent bough of an *Acacia cana*, and the other in a hollow, dead Mulga stump; both contain eggs. These little birds are not particular as to a site for a nest. A Singing Honeyeater has a nest and two eggs in a bunch of Mistletoe, *Lorantus quandang*, growing on a Mulga; this is the commonest of these parasites. *L. Linophyllus* is also on Mulga and Turpentine Bush, *Eremophila Sturti*, and is in flower and fruit. A pair of Black Honeyeaters, *Myzomela nigra*, are building on a dead branch, and another pair have eggs in a tiny nest, also

on a dead branch of an *Acacia cana*, and the colours of nest, sitting bird, and branch blend so that they are difficult of detection.

A conspicuous tree here is the Cork Tree, *Hakea intermedia*, with rugged, corky bark, and all leaves reduced to prickles. Some of these trees are 25 feet in height, but most of them are from 10 to 15 feet. Along the Warri the trees are *Eucalytus rostrata* and *E. microtheca*. We call at Naryilco Station, and, going on, pass back into New South Wales through the Warri gate in the boundary fence in time to make Olive Downs for tea; leaving again soon after, the road becomes very rutty, and before we are two miles out we break a spring, log it up, and keep going, cross the Grey Range again, and arrive at Tibbooburra at about 8.30 p.m.

On the following morning we go out with the local sergeant of police to look up a Wombat which he had seen several days previously, going towards a rabbit burrow, into which it disappeared. He had lived for many years at Delegate, on the Victorian border, where these animals were numerous, and was well acquainted with them, and was quite sure that the animal he had seen was a Wombat. However, after a careful examination of the ground and burrow, we came to the conclusion that the sergeant had seen some other and smaller animal, probably an Echidna. A Mr. Manoel also told us, when speaking of foxes, that he had seen a pair of Dingoes hunting a fox along a netting fence, one keeping behind the fox and the other out from the fence; they soon caught it and tore it to pieces and had it mostly eaten before he disturbed them. When we were at Adavale and Quilpie we learned from local people that the Dingoes were keeping the foxes in check. The paddock we passed through in our search for the Wombat was looking very well with Wild Parsnip and composites. In amongst the granite boulders surrounding the town, *Prostanthera striatiflora*, was flowering freely, with *Eremophila Freelingi* and *Trichinum obovatus*.

Soon after lunch we leave for Milparinka, passing a Bloodwood in full bloom on the outskirts; this one had creamy-white flowers, but north from this town are several of the same species of trees whose flowers are rose-coloured. This is its southern limit in this part of the State. Over Gibber country for about fifteen miles we come to a Gidgee, *A. Cambagei*, forest, which continues until we cross the Evelyn Creek, named by Sturt after his brother, Evelyn Sturt, and run into Milparinka; which we soon leave behind. Recrossing the

creek, we come, at seven miles, to the Bluff which marks the southern limit of range of *Acacia Cambagei* and *Acacia cana*. The Coally flats, subject to inundation by the same creek, are looking well, and we pass many fine stretches that are purple with a luxuriant growth of the Gilgai Pea, *Swainsona procumbens*. Sandhills succeed this; sparingly timbered with Mulga and Dead Finish, the ground being covered with the Ham-and-Eggs Daisy, *Myriocephalus Stuarti*, now well in flower. Cobham Lake appears like a large mirror in the evening light, and its surface is dotted with swans, several with cygnets. We keep on the road for several miles, and then pull off the track into a sheltering clump of mulga to camp, when the crest of Koonenberry loomed in sight out to our left. Attracted by our fire, numbers of large green, offensively-smelling beetles invade our camp, and make things very unpleasant, and keep us busy throwing them into the fire.

On the following day we soon pass Iduna Park Hotel, a solitary hostel on a bare, gravelly plain. From this class of country we pass into sand and Mulga again at Packsaddle, then on to Bancannia Lake, where we note flocks of Avocets and many Red-capped Dotterel on the shore line. On our way to Sandy Creek bore we found the Daisy, *Miriocephalus Stuarti*, only in early bud on our way up, now in full flower. From Sandy Creek to Fowler's Gap, over a gravelly plain, we note several pairs of *Ashbyia Lovensis*, and a white carpeting of *Helipterum corymbiflorum*, with patches of the dull Yellow-button Daisy, *Craspedia crysantha*. The Euriowie Hills are in places a blaze of yellow from the profusion of *Helipterum polygalifolium* clothing the hillsides and valleys. After leaving the hills we find the country, bordering the grand unconformity of geologists, covered with either *Helipterum corymbiflorum*, *Craspedia crysantha*, or a mixture of the two. A few hours more and we are all settled down in Broken Hill again after an absence of thirty days.

Our plant specimens were entrusted to Mr. E. Morris, a local enthusiast, who submitted those taken in Queensland to Mr. C. T. White, the Government Botanist of that State; the New South Wales specimens to the Sydney Herbarium authorities; and one Eremophila, previously taken in South Australia, to Mr. Black, so that I am indebted to Mr. Morris and the authorities mentioned for the naming of the plant specimens, and my thanks are due to them for the trouble taken.

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— OF —

The Field Naturalists' Club of Victoria

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The Author of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS--ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING.

MONDAY EVENING, 8th DECEMBER, 1924.

1. Correspondence and Reports.
2. Election of Members.

AS ORDINARY MEMBER—

	PROPOSER	SECONDER
Miss L. McMahon, "Kilvawe," Whitehorse Rd., Balwyn.	Mr. L. Hodgson	Mr. C. Daley, F.L.S.

3. Nominations for Membership.
4. General Business.
5. Remarks by Exhibitors relative to their Specimens.
   Ten minutes' adjournment for discussion of Exhibits.
6. Reading of Paper and Discussion thereon.
   1. By Mr. J. C. Goudie—"Notes on the Coleoptera of North-Western Victoria," part 12.
   2. By Mr. C. Daley, B.A., F.L.S.—"Around Noojee."

   The committee will be pleased to receive promises of papers for future meetings.
7. Reading of Natural History Notes.
   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same, that he may arrange for their bringing them before the meeting; such notices should, however, be brief.
8. Exhibition of Specimens and Conversazione.
   Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Club year ended on 30th April last. Any subscriptions overdue should be forwarded to the Hon. Treasurer at once. Subscriptions for the year 1924-5 became due on 1st May.

SPECIAL NOTICE.—The attention of members is directed to item 8 of business paper. Notices of exhibits should, if possible, be type-written.

WILD FLOWER SHOW.

Members who had tickets for sale are requested to account for them at the monthly meeting.

LIBRARY.

The Hon. Librarian desires that all books and magazines belonging to the Club be returned at the December meeting, to facilitate the re-arranging of the Library.

The Victorian Naturalist

Vol. XLI.—No. 8. DECEMBER 3, 1924. No. 492

FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 10th November, 1924.

The President, Mr. J. Searle, occupied the chair, and about sixty members and visitors were present.

REPORTS.

A report of the excursion to the Brisbane Ranges on Saturday, 25th October, was given by the leader, Dr. C. S. Sutton, who said that a small party left town by the morning train for Bacchus Marsh, from whence they motored out about five or six miles towards Staughton Vale. Here the ranges were entered, and the track followed to the Geelong Reservoir. Owing to the cool and moist season, quite a number of interesting plants were still flowering, and a good collection of specimens was made.

A report of the excursion to the Domain, South Yarra, on Saturday, 1st November, was given by the leader, Mr. P. F. Morris, of the National Herbarium. Some twenty-five species of grasses were collected, nearly all of which were introduced species; their principal characters were pointed out, and attention was called to the dependence of the human race on grasses and their products for food, textile manufactures, etc., while domestic animals were also to a large extent dependant on them in one form or another.

A report of the excursion to Mornington on Tuesday, 4th November (Cup Day), was given by the leader, Mr. F. Cudmore, who said that a party of ten left town by the early train, and was met at Mornington by four local friends. The coast road was followed for about two miles to the "Fossil Beach." Here lunch was partaken of, and then, descending to the beach, the hunt for fossils commenced. These occur in a deposit of "blue clay," partly below sea level, and are fairly numerous, representing a large range of species. The find of the day was a perfect specimen of *Cypræa gigas*, McCoy, the largest known species of cowrie, living or fossil. Fragments or complete specimens of several other notable species were also obtained. A couple of hours were pleasantly spent, and the party returned to the station for the 5 p.m. train just at steady rain was setting in.

A report of the excursion to Eltham on Saturday, 8th No-

vember, was forwarded by the leader, Mr. W. Tonge, who said that about fifteen members had visited Eltham for the purpose of an afternoon among the birds. The afternoon was not promising for ornithology; however, in course of the afternoon, quite a number of species were met with, the first being three White-fronted Herons, perched in the top of a dead gum, assuming attitudes resembling dead branches. The nest of a pair of Rosella parrots in an old decayed stump was noted. Numerous other nests were found, and after afternoon tea at the leader's house the party left for the evening train.

Mr. F. Pitcher said that the members were very much indebted to Mr. Tonge for the interest of the afternoon's outing, and moved that a hearty vote of thanks be accorded to him and Mrs. Tonge for their hospitality. This was seconded by Mr. C. Daley, and carried unanimously.

ELECTION OF MEMBER.

On a ballot being taken, Rev. Geo. Cox, "Gunyah," Mornington, was duly elected a country member of the Club.

GENERAL BUSINESS.

The hon. treasurer, Mr. A. G. Hooke, reported that the Exhibition of Wildflowers had been a financial success. There were still some sales of tickets to be received, and some accounts to be met, but he anticipated there would be about £100 to share between the Bush Nursing Association and the Club.

The President congratulated the members on the result, which he considered very satisfactory.

Mr. H. B. Williamson, F.L.S., said that, from a botanical point of view, it was also satisfactory. It was unfortunate that some flowers intended for exhibition had not reached town till the next day, and that some exhibits did not bear the name and address of the sender, so could not be properly acknowledged.

Reference was made by Mr. F. G. A. Barnard to the kindness of Mr. F. Keep in providing two portable stands for use at the flower show, and for arranging for the cartage required on the day of the exhibition. He moved that a vote of thanks be accorded to Mr. Keep. This was seconded by Mr. F. Pitcher, and carried by acclamation.

Mr. C. Daley, F.L.S., drew attention to the destruction being caused by sawmillers in the valley of the Loch River, near Noojee, where some fine myrtle beeches and fern gullies were being spoiled by the extension of tramways. He read a draft of a letter which he suggested should be sent to the

Forest Department, asking that every effort should be made to preserve the beautiful beech and fern gullies of the district.

Mr. A. G. Brown, M.A., endorsed all that Mr. Daley had said, and seconded the resolution that a protest should be made to the department regarding the matter. The motion was adopted.

PAPER READ.

By Mr. J. H. Harvey, A.R.I.V.A., entitled "Notes Along the Coastal Railway, from Brisbane to Maitland."

The author, with the help of a fine series of lantern slides, gave some account of the scenery met with during the railway journey from Brisbane to Sydney, via the coastal line. This line, which may eventually become the main route between Sydney and Brisbane, passes through some fine semi-tropical country, with associated big rivers. From the line can be seen many crops unknown to southern residents, such as sugar-cane, pineapples and bananas. He also gave a number of illustrations of the towns passed through, some of which are of considerable importance.

EXHIBITS.

By Mr. C. H. Borch.—Thirty-three species of Satyrid Butterflies, "browns," including eleven Victorian, three New South Wales, sixteen English, and six Foreign; some of them showing remarkable colourings for this family.

By Mr. F. A. Cudmore.—A large fossil shell, *Cypraea gigas*, McCoy, from the tertiary (Balcombian) clays of Balcombe's Bay, Mornington, collected on the Club's excursion, Cup Day; also several cases of fossils from the same locality.

By Mr. V. Miller.—Fossil shells from Fossil Beach, Mornington.

By Mr. J. Searle. Parasitic Copepoda, Lernaepoda sp. on the claspers of the Ghost Shark, *Chimaera Ogilbyi*, from Bass Strait.

By Dr. Sutton.—*Senecio elegans* from Point Lonsdale. Four years ago one plant was seen near the lighthouse; now it is very prevalent. Also herbarium specimens of the following plants from the Brisbane Ranges:—*Eriostemon obovalis*, *Pultenæa laxiflora*, *Bossiæa microphylla*, *Grevillea floribunda*, *G. aquifolium*, *G. parviflora*, *Olearia iodochroa*, *O. teretifolia*, *O. pannosa*, *Prosthanthera denticulata*, *Pomaderris ferruginea*, and others.

By Mr. H. B. Williamson, F.L.S.—Living specimen of Lizard, *Trachydosaurus rugosus*, collected at Kooloonong, Northern Mallee.

After the usual conversazione the meeting terminated.

EXCURSION TO BENDIGO.

On Saturday, 4th October, the occasion of the Railways Picnic was taken advantage of, and five members of the Club journeyed to Bendigo by an early train, where they were met by Mr. D. J. Paton. After dinner, from the terminus of the train line at Back Creek, the party proceeded in a south-easterly direction through the ranges. The country was looking at its best, the early rains having had the effect of making the wildflower season earlier than usual; hence, the Golden Wattle, *Acacia pycnantha*, except for a belated bloom or two, was in the fruiting stage, whilst the Fairy Wax-flower, *Eriostemon obovalis*, was past its best. These two plants, amid the Ironbarks, *Eucalyptus sideroxylon*, are the glory of the hills when in full bloom in September. However, the Wax-flower still made a fair show, whilst the Pink-eye, *Tetratheca ciliata*, with its ever-attractive flowers, varying almost from pink to magenta in colour-shading, was very fine. The Narrow-leaf Bitter-Pea, *Daviesia corymbosa*, and the Gorse Bitter-pea, *D. ulicina*, were in good flower, as also the Rice-flower, *Pimelea spathulata*. Orchids were scarce, but the Wax-lip Orchid, *Glossodia major*, still lingered. Droseras, Helichrysums, and a few composites, were flowering. An evidently intrusive patch of Common Fringe-Myrtle, *Calytrix tetragona*, was met with, its clustering pink flowers being very fine. The Diggers' Speedwell, *Veronica perfoliata*, was in bud. In the vicinity of Peiper's Hill, near the Strathfieldsaye Road, the scrub flora improved. Crossing the road, the Sun Orchids, *Thelymitra aristata, and T. longifolia*, were numerous, and of large size. The Geebung, *Persoonia juniperina*, was in fruit. The Mountain Grevillea, *G. alpina*, varying in shade from almost white to red, was abundant through the ranges; also the Common Fringe-lily, *Thysanotus tuberosus*, and the Flax-lily, *Dianella revoluta*. A diversion was made to the Grassy-flat Reservoir, and past St. Aidan's Orphanage on the homeward track, about six or seven miles being traversed in all.

On Sunday the party proceeded by motor through Kangaroo Flat, the fine avenues of elm trees and Blue Gums *en route* being much admired. Near Kangaroo Flat the gums on the roadside have not been much interfered with, and provide both ornament and shelter. Reaching the Gap at the Big Hill, our destination, we left the motor, and climbed up the hill to the highest point, the aneroid registering 1620 feet above sea-level. From here a most pleasing and exten-

sive panorama of great extent was before us. Southwards was Mt. Alexander and neighbouring ranges; further westwards, and not far distant, the Mt. Tarrangower ranges, the Daylesford Ranges in the farther distance, and on the horizon the outline of the Pyrenees. Past intervening ranges, Mount Hooghly, near Dunolly, and Mts. Moliagul and Kayoura stood out, then Mt. Korong, to the north-west, and over the plain country Pyramid Hill, due north. Eastward, the trees obscured the view somewhat, but the ranges of the Heathcote and intervening country were visible, whilst seven miles away, amid its hills, lay the city of Bendigo. Here and there were glimpses of settled places, and water conservation. The whole country, owing to plentiful rains, was verdant. From Big Hill can be seen in marked contrast the striking difference between the flora of the granite areas with their open, park-like aspect on the eastern side, and the denser forest growth of the more broken ranges of the Ordovician measures on the other. Towards Ravenswood, a little distance away, at the foot of the granite hills, and along the valleys, were extensive patches looking like snow amid the green sward. A visit to one of them showed that the white patches were caused by countless numbers of the composite *Helipterum cotula*. After lunch on the summit of the hill, a course was taken through the slopes and valleys, eastwards. Wax-flower was again scarce. Orchids represented were, *Glossodia major*, a specimen each of the Snake Orchid, *Diuris pedunculata*, and the Musky Caladenia, *C. testacea*, three flowers of Pink Fingers, *C. carnea*, completing the list. Of Acacias, only *A. armata* was in bloom. The Prickly Grevillea, *G. aquifolium*, with blackish flowers, is found growing freely in this area; also, scantily, the Purple Swainson Pea, *S. lessertifolia*. Creamy Stackhousia, *S. linarifolia*, with flowers varying from creamy to yellow, was abundant. We were fortunate to gain the shelter of our conveyance at Cherry-Tree, just before the bursting of a storm, which had been long brewing, and to reach Bendigo without being drenched by the rain. The number of species of plants seen on Saturday was 63, and on Sunday 94—total, 113. The week-end was most enjoyable, weather and other conditions being favourable.

This was the seventh Club excursion to Bendigo, and there are still areas unvisited, which will well repay inspection. Time was found on Saturday to visit the Conservatory and Fernery, both of which have attractions, and are in good order, whilst the results of tree-planting in the streets many

years ago gave frequent cause for admiration of this wise policy. It was noticed that in the streets the Wax-flower and other wildflowers were on sale, this growing practice being much against the preservation of the native flora.

The following seventeen plants have not been recorded previously on these excursions:—

GRAMINEÆ
Stipa setacea
CYPERACEÆ
Lepidosperma filiforme
LILIACEÆ
Dianella levis
Lomandra filiformis
PORTULACACEÆ
Claytonia australasica
LEGUMINOSÆ
Pultenæa laxiflora var pilosa
Swainsona lessertifolia
GERANIACEÆ
Erodium cygnorum
CALLITRICHACEÆ
Callitriche verna
GUTTIFERÆ
Hypericum japonicum
BORAGINACEÆ
Cynoglossum sauveolens
SCROPHULARIACEÆ
Veronica perfoliata
GOODENIACEÆ
Velleia paradoxa
BRUNONIACEÆ—
Brunonia australis
COMPOSITÆ
Toxanthus Muelleri
Helipterum cotula
Helipterum exiguum
Guaphalium luteo-album

D. J. PATON.
CHAS. DALEY.

EXCURSION TO MORNINGTON.

A party of ten members caught the 8.45 a.m. train on Tuesday, 4th November (Cup Day), for Mornington. On arrival there four local friends joined the party, which then followed the coastal road in a southerly direction towards the Fossil Beach. About two miles from the station a sign-post marks a track, which descends through the scrub to the sea. Tables and seats, sheltered by the trees, have been erected by the local Progress Association on a small cliff overlooking the bay, and as the track has been rendered suitable for cars this spot is rapidly becoming a favourite picnic spot. At one time a cement works was established here, but the long-disused lime kilns are now overgrown by trees. On the beach can be seen the outcrop from which the limestone was obtained. After having boiled the billy and had lunch, the party walked along the coast for some 200 yards towards Mornington, until the best exposure of the fossiliferous clays

was reached; there a search was commenced for fossils. Geological hammers and a pick were used to dig up the clays, when the fossils, which were plentiful, were extracted in perfect condition with the aid of knives. A specimen of *Aturia Australis*, McCoy—a cephalopod shell allied to Nautilus was obtained: a very closely related species is common in rocks of a similar age in Europe. The rare *Nautilus Balcombensis*, Chapman, was represented by some fragments. A specimen of the bivalve shell, *Cucullæa corioensis*, McCoy, was the largest the leader has seen from that locality, and was of particular interest, as it showed the carbonised remains of the hinge ligament. Species of corals, cones and volutes were common, while the cowries collected included a small, ridged form, *Trivia avellanoides*, McCoy, which is still living off the N.S.W. coast in deep water. A fine specimen of *Cypræa gigas*, McCoy, was exposed by the pick, and is exhibited to-night. This is the largest species of cowrie, living or fossil, in the world, and is considered a great find by fossil collectors. After having spent a couple of hours collecting, the party returned to the picnic tables for afternoon tea, later walking back to Mornington to catch the 5.10 train to town. With the exception of one shower, the rain held off until the party had returned to Mornington, and I think members enjoyed the outing.—F. Cudmore.

EXCURSION TO ELTHAM.

The afternoon of Saturday, 8th November, was not too promising for ornithology, but about fifteen members turned out for the afternoon's outing. The bridge leading to our destination being under water—the creek being in heavy flood—we were obliged to make a detour along the railway, which caused some delay in getting to our working ground. The district is rich in bird-life, but the birds were unusually quiet, which is not usual after rain. However, as we approached the creek again there was more evidence of some species, at least. The first interesting event was the approach of three White-fronted Herons, *Notophoyx novæ-hollandiæ*, which alighted in a dead tree, and assumed attitudes resembling the dead branches. One of the party was not long in locating a nest of the birds high up in the horizontal limb of a tall River White Gum, *Eucalyptus radiata*, and containing one young bird perched motionless on the edge of the nest. Passing along the siding of the gully, from

which some orchids and other wildflowers were gathered, the nest of a pair of Hazel-eyed Crows, *Corvus coronoides*, was noted about 60 feet up in a Stringy Bark, some of the birds being disturbed from about the nest. Close by, on the horizontal limb of another Stringy Bark, a pair of Choughs, *Corcorax melanorhamphus*, had their nest, containing young birds. After a little delay we succeeded in locating an old, decayed stump, where, in the earth at the bottom, a pair of Rosella Parrots, *Platycercus eximius*, had cleaned out a hole for a nest on 5th October. On the 8th there were three eggs in the hollow, with the female sitting on them to keep them dry, but, owing to the heavy rains at the time, they were later abandoned. A little farther on another Chough's nest was noted, also built on a limb of a Stringy Bark. Not far away a pair of Sparrow Hawks, *Accipiter cirrhocephalus*, had their nest of twigs and leaves built about 25 feet up in a Stringy Bark tree, the male bird doing a fair share of the sitting. While watching one of the birds sitting on the nest, its mate was sailing about overhead with a small bird in its talons, evidently for the sitting bird. In the gully close by we came to the nesting hole of a pair of Spotted Pardalotes, *Pardalotus punctatus*, from which the young birds had flown early in October. Overhead a male Rufous Whistler, *Pachycephala rufiventris*, was giving a fine exhibition of its vocal powers. The party then proceeded up to the house, and had afternoon tea, after which a few more nests near the house, including the snug little nest of the Short-billed Tree-tit, *Smicrornis brevirostris*, built low down in a hanging bough of Red Box; the nest of a pair of Brown Fly-catchers, *Microeca fascinans*, and other nests were examined before leaving for the station.—W. C. Tonge.

The Tasmanian Naturalist.—This journal, which has been missing from our exchanges since 1911, owing to the inability of the Tasmanian Field Naturalists' Club to overcome the greatly increased charges for printing and publishing, has reappeared as No. 1 (New Series), for October, 1924. It consists of twenty-eight pages (double-column) of articles by Tasmanian naturalists. Mr. Clive Lord writes on the fish fauna of the State, also Tasmanian reptiles, parrots and whales. Mr. A. N. Lewis deals with outlines of geology, as evidenced in Tasmania; Mr. L. Rodway with gum trees. Altogether a useful contribution for nature students.

EXHIBITION OF WILDFLOWERS.

The Annual Exhibition of Wildflowers was held in the Melbourne Town Hall on Tuesday, 21st October, 1924. The date mentioned was the earliest in October on which the hall could be obtained, and in ordinary seasons would probably have proved much too late to make a good display of our native flowers, but, fortunately, the season turned out so wonderfully cool, with frequent showers, that when the day arrived it was found that the display was quite up to the average of previous years. A late date has its compensations, for it enabled flowers to be exhibited which do not bloom till after the usual date of these exhibitions.

The exhibition was officially opened by Sir James Barrett, President of the Victorian Bush Nursing Association, to which society it had been announced that half the net proceeds would be given. In declaring the exhibition open, which he did with a very brief speech, Sir James Barrett said that there were three things to be grateful for, viz., that we had such beautiful flowers, that the public took such an interest in them, and that the Bush Nursing Association would gain in funds by the holding of the exhibition. He congratulated the Club on the excellence of the display, and the fine attendance of visitors.

Owing to the generosity of a member, two portable stands were erected in the centre of the hall, and enabled large quantities of flowers to be displayed to better advantage. The nearest to the entrance was filled with the Fairy Wax-flower, *Eriostemon obovalis,* and other flowers from the Tarradale district, specially collected by Mr. G. Coghill. A fine display of Australian flowers, grown at the Melbourne Botanic Gardens, was, by the courtesy of the Director, Mr. W. Laidlaw, B.Sc., made by Mr. P. R. H. St. John, whose interest in the Australian flora is well known. Among the fifty or so species exhibited may be mentioned the crimson flowers of the Queensland Spear-lily, *Doryanthes palmeri;* several species of Grevillea, from various States; Boronias, Pultenaeas, Dillwynias, Kunzeas, Westringias, Chorizemas, Swainsonas, etc., the whole making a brilliant and effective display. Included in the exhibit was a quantity of *Boronia pinnata,* from Labertouche, West Gippsland, a charming shrub, which is deserving of extensive trial in our gardens. From the gardens came also a quantity of native foliage, which greatly helped in the decoration of the hall.

The orchid display made by Mrs. Coleman, of Blackburn, and friends, was a centre of attraction. Here, at least fifty species of orchids from all parts of the State were displayed. The genus Caladenia was represented by a dozen species, including *C. alba, angastata, cucullata, cordiformis, cardiochila, dilatata, leptochila, reticulata* and *testacea;* ten species of Sun-orchids, Thelymitra, including *T. epipactoides, grandiflora, macmillanii* and *paniculata;* ten species of *Pterostylis* (Greenhoods), including *P. alpina, barbata, falcata, mutica, pusilla,* and apparently a new species or variety, probably a hybrid between *P. falcata* and *P. nutans.* Others were *Sarcochilus parviflorus, Calochilus Robertsoni, Lyperanthus nigricans, L. suaveolens, Diuris longifolia,* and *Microtis parviflora.* An interesting plant of *Caladenia dilatata,* with a flower-stem eighteen inches long, was exhibited by Mrs. Howie, of Vermont, the leaf and flower being proportionately large. Some of the exhibits sent by State Schools consisted largely of orchids, that by the Emerald School being especially good, while Master R. Foubister, of Panton Hill School, sent a most carefully collected series, in splendid condition.

Owing to the late date of the exhibition, *Glossodia major* did not make that splash of colour which usually sets off the orchid display.

A long table was set apart as a "Classification Table." On this Mr. H. B. Williamson, F.L.S., grouped together specimens of certain orders, such as Proteaceæ, Compositæ, Leguminosæ, Myrtaceæ, from all parts of the State, so that students might be able to see at a glance the relationship between the various genera.

The exhibition was under the management of Mr. F. Pitcher, to whose enthusiasm much of its success is due. He was ably assisted by Mr. H. B. Williamson, F.L.S., Dr. C. S. Sutton, and Mr. G. Coghill, to whom fell the impossible task of trying to name the specimens in time for the admittance of the general public.

Included in the display of Western Australian flowers, kindly secured through the good offices of Miss Amy Fuller, were a number of very showy species, several of which had not been seen at previous exhibitions. The ever-popular Kangaroo-paws from that State were in great demand, and likewise the Waratahs from New South Wales. Perhaps the greatest novelty in the hall were some double flowers of the Fairy Waxflower, *Eriostemon obovalis,* sent by Mr. Semmens,

Forest Inspector, Bendigo, from a plant growing near his house.

Flowers were received from a wide range of localities, but it is impossible to more than name the locality and sender. Several packages were without the name of sender, or place collected. Contributions were also received from several Bush Nursing Centres, while collections from State Schools in various parts of the State showed the widespread interest created by the exhibition. As far as could be ascertained, the following is a list of localities from which packages were sent, with the name of the contributor, where given:—

North and North-west.—Taradale, Mr. G. Coghill, Mr. C. Hansford; Bendigo, Mrs. W. H. Warren; Korong Vale, Miss E. M. James; Maldon, Mrs. Brooks, Mr. A. McArthur; Tempy, Bush Nursing Centre; Rushworth, Mrs. Rich.

South-west.—Beaufort, Mr. S. Young; Stawell, Mr. J. A. Hill; Grampians, Mr. C. W. D'Alton.

South.—Forrest, Bush Nursing Centre; Brisbane Ranges, Rev. A. C. F. Gates; Wallan, Rev. W. F. Hart; Diamond Creek, Mrs. Saunders; Eltham, Mr. W. Tonge; Wonga Park, Mr. Dyer; Doncaster East, Mr. F. G. A. Barnard; Ringwood, Mr. James; Montrose, Mrs. G. Richards; Mt. Dandenong, Miss G. Nokes, Miss May and Jessie Young; Pakenham, Mr. F. Wisewould; Mornington, Rev. G. Cox; Red Hill, Mr. E. Haig, Mr. N. C. Higgins; Frankston, Mrs. J. O. Reid, Mr. J. W. Andas, Mr. V. Miller; Cheltenham, Mr. C. Daley; Brighton, Mrs. Ballard; Middle Brighton, Miss S. Kinvig; Keysborough, Mr. H. Dickens.

South-east (Gippsland).—Garfield, Miss L. Dyall; Drouin, Mr. W. F. Dyall; Lardner, Miss C. C. Currie; Tyers, Miss J. Galbraith; Heyfield, Mrs. McFarlane; Briagolong, Mr. R. R. Penny; Bairnsdale, Mr. T. S. Hart; Paynesville, Mr. F. Barton, junr.; Hedley, Misses L. and E. Rossiter.

North-east.—Nagambie, Mrs. Cameron; Wattsville, via Dookie, Mr. O'Dowd; Lima East, Mrs. Evans; Beechworth, Miss M. Scott; Springhurst, Mrs. J. D. Read; Chiltern, Mrs. W. Boucher.

Flowers were received from the following State Schools: Panton Hill, Queenstown, Wonga Park, Healesville, Mt. Evelyn, Emerald, Langwarrin, Red Hill, Black Rock, Newry, Nowa Nowa, Orbost, Middle Tarwin, Macedon, Deep Lead and Castlemaine.

Cultivated native flowers came from the gardens of Mr. J. Watson, "Maranoa," Balwyn; Mr. G. Coghill, Canter-

bury; Mr. L. Hodgson, Canterbury; and Mr. W. Robinson, flowers of Victorian Waratah, grown at Kinglake.

A display of about 350 water-colour drawings of Australian and South African native flowers by Miss Amy Fuller attracted considerable attention.

A volume of dried New Zealand Ferns exhibited by Miss Taylor, of Brighton, proved interesting to many visitors.

Interstate flowers were received from:—New South Wales. —Mr. Chalker, Hill Top. South Australia.—Miss E. Macklin, Adelaide; Mr. J. Davies, Hutt Street, Adelaide. Western Australia.—Mrs. D. Kelvington, Hawthorn, Perth, and Mr. T. H. Morgan, Darlington. Unfortunately, the flowers sent by the Field Naturalists' Society of South Australia were delayed in the post, and were too late for the exhibition. Owing to the severe drought at Broken Hill, the Barrier Naturalists' Club was unable to forward any flowers of Sturt's Desert Pea, an attractive flower, which is always in demand at the sales table.

Pot-grown plants of native species were on sale, and with the sale of bunches of flowers brought in a considerable amount. These sales were conducted by a number of ladies, headed by Miss A. Fuller, while Miss H. Gabriel and other ladies had the management of the refreshment tables.

Several members and friends provided microscopes, under which were shown botanical objects. These proved a great source of attraction and wonder.

It is expected that there will be at least £100 to share between the Club and the Bush Nursing Association.

The Cryptogams of the Hurstbridge Excursion.—The district traversed was not very favourable for the growth of non-vascular cryptogams. Of Hepaticae, several Lophocoleæ and Chiloscyhpi, *Fimbriaria Drummondii*, a species of Frullania, and the common Austral Liverwort, *Marchantia cephaloscyphi*, were noticed, whilst the following mosses, with several others not gathered, were common, viz., *Bryum bimum, Brotelia affinis, Ceratodon purpureus, Funaria hygrometrica Tayloria octoblepharia, Tortula princeps. Thuidium tacturosum* and *Triquibrella papillata*. Fungi were also scarce, a few Agarics and Geasters (Earth stars) only being noticed. Little attention was paid to Lichens, but those seen were probably identical with those found in similar places round Melbourne.—J. R. Leslie.

NOTES ON THE COASTAL RAILWAY JOURNEY FROM BRISBANE TO MAITLAND.

By J. H. HARVEY, F.R.V.I.A.

(Read before the Field Naturalists' Club of Victoria, 10th November, 1924.)

Leaving South Brisbane, the inner suburbs are passed through for about six miles, good views of One Tree Hill being obtained until Morooka is reached; then hilly country gives place to undulating landscape. After passing Bethania Junction, the line skirts the Albert River, afterwards crossing it. The country now becomes more hilly again, the formation consisting of sandstones and shales, the land being cleared and cultivated. Much of what appears to be Paperbark Tea-tree of a dwarf type is passed through, and at about thirty miles the bush is entered again. The Comera River, a fine stream, is crossed, the river flats being rich, and all well-cultivated; apart from the flats, the soil is poor-looking. At 47 miles Ernest Junction is reached. Here a branch line runs off to South port, a fashionable watering-place. From near here the cable is taken to Norfolk Island. Banana-growing country is now entered, and approaching Mudgeeraba are fine and very extensive flats and dairy farms. The decomposed shales and sandstones still persist. To the south-west the picturesque McPherson Range is now plainly seen, and after passing West Burleigh the line runs over sandy flats, followed by swamps, the ocean being only about 100 yards distant, until, at Coolangatta, on the New South Wales border, and 69 miles from Brisbane, the train draws up. Half a mile further is "Tweed Heads," which is really the terminus.

Tweed Heads and Coolangatta are virtually the same town, only being in different States. The "border line" is a piece of neutral land, only a few feet wide, along which are two fences, one on each side of the real dividing line; these are cattle-proof fences, to prevent tick-infected cattle from Queensland entering New South Wales. The two form rather a good town, electric lighted, possessing good picture theatres, and commodious family hotels; it is really a watering-place for Brisbane, Lismore and the back country. The geological formation here is basalt, which runs out into the sea on the north, forming Greenmount and Pt. Danger, and ends on the south in another headland, Point Fingal, on

which is a lighthouse with a revolving light. The Tweed River spreads out behind the town into a large lagoon. From the summit of a hill called the "Razorback" the scene is fairly extensive, and the topography of the country around may be easily studied. The Tweed is navigable as far as Murwillumbah, a run of three to four hours by the river steamer, and there is a good steam service, also a motor car service, the distance by road being 20 miles. I chose the steamer. Leaving Tweed Heads at 7 a.m., on a bright morning, we passed between plantations of bananas and sugar-cane, and these were varied with luxurious sub-tropical vegetation. The banana industry was, until a year or two ago, a very flourishing one; it was no uncommon thing for some of the planters to net £100 per week from bananas; then a disease known as "bunchy-top" developed, and large numbers of the planters were ruined. Many trees which had been attacked were pointed out to me as the steamer went along. At a place called Cudgell is a sugar mill, the railway lines from which run out 14 miles into the plantations. The growing sugar-cane is a light pea-green in colour, and looks not unlike maize; it grows to a height of about 12 feet, though I was told that it is no unusual thing for it to attain a height of 18 feet at times, with a thickness of 1¾ to 2½ inches. The hills are volcanic, and the soil on the flats is deep and rich. During the whole run, the fantastic outline of Mt. Warning provided fine backgrounds to the hundred pictures which opened out as the steamer progressed.

The run from Murwillumbah to Lismore is done by train, over basaltic country of a broken and very picturesque nature, with fine, rich brush foliage along the banks of the creeks which, as well as tunnels through spurs, are plentiful. There must at one time have been very dense forests all through here. The train left at 6 a.m., and the manner in which the hills and gullies were picked out under the early morning sun formed an endless series of pictures. Dairy farming appears to be the staple industry, while banana farms are plentiful on the hills. The approach to Byron Bay is over a morass-like area, and the hills which run out into the sea there form a bluff on which the lighthouse is erected. At Byron Bay there is a butter factory, said to be the largest in New South Wales (some say in Australia). Leaving Byron Bay, a steep hill is climbed, and the same kind of picturesque scenery is noted; the general look of the country was not unlike much of the Western District of Victoria.

Passing through Bexhill, the igneous country gives place for a short distance to shales, and a firebrick factory is noted. The shale formation is soon left, and the volcanic soil encountered again.

At 62 miles from Murwillumbah, Lismore is reached. Lismore is on a tributary of the Richmond River, and is a very well-built, lively and prosperous town. This run was the most charming rail journey that I had had for a long time. The town is built on a flat, which is situated in an alluvial basin, and has a pretty setting. It is connected with North Lismore by a good bridge. Ocean-going steamers trade between the town and Sydney, and other parts, the wharf being 70 miles from Richmond Heads; the distance by road is 20 miles. The town was a great place when the cedar and other useful timbers were plentiful; but things have changed, and the means of trade have to change with them.

Leaving Lismore, the hills are contoured by the line for some distance. They are very steep, and were apparently well-timbered at one time. As the line began to rise out of the valley, it was noted that dairy farms were abundant, and the soil was good. After leaving Bentley, a tunnel is passed through, and we now began to rise out on to the plain. After the Richmond River flats are left the country is not worth travelling, as far as scenery is concerned, and the soil passed through appears rather poorer, though now and then a better patch is seen. About five miles before reaching Grafton a glimpse of the Clarence is obtained, but the country is still flat and uninteresting. (It must be understood that I was out for scenery; I took but little notice of the economic value of the land.) Grafton, although so old a town—and a cathedral town, too—is exceptionally quiet. Every day there seems almost like Sunday. The streets are wide, and are laid out at right angles, and the principal streets are planted —some having two rows. These are red and white cedars, camphor laurels, planes, flame trees and grevilleas. In Prince Street is a plain brick clock tower, about 35 feet high. Every one of these towns has its picture theatre. In the street leading from the railway station to the town there is an avenue of jackaranda trees, which were in full bloom as I passed through. Some of the buildings are good, especially the Post Office Court House, two or three banks, and the Roman Cathedral. The river is said to be 750 yards wide, and connection with South Grafton is maintained by steam-ferry. Singular to relate, there is no electric light in Graf-

ton, which is gas-lighted, but the electric light is in use in South Grafton. The town is certainly old-fashioned. It is about 50 miles by river from the city to the Heads.

At South Grafton the train was picked up again, and the country soon changed, the part now entered showing shales and sandstones containing concretionary ferruginous bands, the general appearance being very similar to that of the Hawkesbury sandstone formation, and this continues for the greater part of the way from here to Sydney, broken only occasionally for short distances by sandy flats and marshy-looking patches here and there, and by short igneous intrusions. In places the hills and escarpments remind one of parts of the Kangaroo Valley, and other portions of the off-shoots of the Blue Mountains, although not quite so dramatic in appearance. After passing through Glenreagh, some of the bluffs are very bold. The streams that are crossed and skirted are lined with rich brush foliage, and as much of this was in bloom many of the gullies presented a very gay appearance; it gave one an idea of what scores of miles of this country must have looked like before it was denuded; the timber must have been very rich in parts of it. Suddenly, just before reaching Coff's Harbour, a chain of steep hills is passed through, and in these the brush and undergrowth, palms, elk horn ferns, and vines grew quite luxuriantly; the whole place is a veritable jungle. At Coff's Harbour works to improve the harbour are in progress, and on one of the heads a large quarry, in what looks like a bluff of basalt, provides useful material for the work. Through Urunga to Macksville the rough country continues. Macksville is practically a wooden town, and the streets, such as could be seen, as it was almost dark, seemed irregular and narrow. Here we were hurried into a fourth-class hotel for tea, and as I had been told that there was only tame country between there and Taree, on the Manning, I went on to the latter town through Kempsey and Wauchope, 108 miles, in the dark. With that exception, I saw the whole of the country by daylight.

Leaving Taree at 9.30 next morning, the country resembled that in the locality of Penrith, east of the Blue Mountains. Soon the sandstone hilly country was met again, and the luscious foliage lining the streams that were crossed, with flame trees and other trees in full bloom, provided magnificent pictures which would have captivated any eye. The line runs along a valley, in which farms are plentiful, and

between Mt. George and Somerset the Manning is crossed; after this a stream was passed over, the jungle on which was so dense that the water could not be discerned, and the whole of the growth along it was a blaze of colour, the pale yellow, orange and red bloom being exceedingly prolific. Farms were seen beside the line, and flame trees, all scarlet with bloom, were plentiful; the richness of the foliage reminded me of that of blackwood, though what it was I am unaware. The landscape is now eroded into abrupt hills and V-shaped valleys, and bold ranges appear between the line and the coast. Some time before Gloucester is reached the line skirts the Barrington River, and lovely views are seen. Swamp oaks, apple tree, spotted gum, box, grey gum, white mahogany and blackbutt abound. The country continues mountainous, and near Gloucester is plenty of ironbark and tallowwood, the latter favoured for street-blocking and for floors.

Near Dingadee the road is seen winding through the seemingly-interminable sandstone, and after passing through another tunnel, about 700 yards long, the country resembles that about Picton on the southern line, the rich-looking paddocks and patches of luscious foliage recalling the scenery of the Illawarra district. Passing through Dungog, the same scenery continues, and, at 211 miles from Macksville, the pretty town of Paterson is reached. The river flats are very fertile, and support extensive dairy farms. The Hunter is crossed near Okehampton, and at 224 miles West Maitland is reached; here the main northern line is joined, and as far as I was concerned the journey was over, as I had traversed the route between there and Sydney so frequently before.

Very little bird life was noticed during the whole of the journey; this may have been due to the extremely high temperature that prevailed, or to the comparatively dry condition of the country—perhaps to both.

Regarding the topographical features of this route, it is of a far more picturesque and interesting nature than the main northern line, via Armidale and Tenterfield, for tourists who desire to observe scenery, and I hope to go over it again some day, under more favourable weather conditions.

THE EASTERN WATER-DRAGON, *Physignathus lesueurii*.—The three photographs of the Water-Dragon Lizard exhibited to-night were taken on the Aberfeldy River, Gippsland. The photographs of two other species of Dragon Lizard are shown for the sake of comparison. Lucas and Le Souef, in their book,

"The Animals of Australia," describe the Water-Dragon as follows:—"Tail, strongly compressed. Body, dark olive above, with darker and lighter crossbars, most marked on the tail; a broad dark band runs from the eye, over the ear, to the shoulders. The cheek pouch is barred with lines of yellow and blue. Length, to over three feet. Habitat, Eastern Australia." The Water-Dragon belongs to the family of Agamidæ, most members of which are unjustly known as "Bloodsuckers." The above-mentioned authors adopted the name of "Dragon Lizard" as being more appropriate. The Water-Dragon is the most distinctly aquatic lizard, and frequents the banks of creeks and rivers from Gippsland to Queensland. I have observed it only in the Thomson and Aberfeldy Rivers, where it appears to be very local, extending only for a couple of miles from the junction of the two streams, being more plentiful in the clearer, and warmer, waters of the Aberfeldy. In other streams of a similar character in the same district it is absent. It is fond of basking on a log or rock close to or in the stream, and there can be approached very closely if no quick movement is made. On being disturbed, it dives in, to re-appear almost immediately, swimming on the surface. If further molested, it dives and stays on the bottom for a considerable time. It swims with a serpentine motion, but not very rapidly, using the tail only, with the limbs pressed close to the sides. The food seems to consist mostly of insects and small animals floating on the surface of the water. From its resting place it plunges into the water to secure a drowning insect, and returns immediately to its look-out. Small dead or disabled fish may also be devoured, but I should say that it is not quick enough in the water to catch healthy ones. I once hooked one on a devon spinner in the Thomson, and on another occasion, while still fishing, a large one, after attempting to swallow the cork floater, dived down and took the earthworm bait. This specimen was sent to the Melbourne Zoo, where it lived for nearly a year. The Water-Dragon is a swift runner, and on a level surface will sometimes assume a semi-erect posture, and run for several yards on the hind legs alone. This peculiar gait is also characteristic of its distinguished cousin, the Frilled Lizard of Queensland. I am not aware that any of the other dragons do this, but the Long-tailed Racer Dragon, common in the Eastern scrubs of Port Phillip Bay, may do so. This latter is undoubtedly the champion sprinter of the tribe. The eggs of the Water-Dragons are buried in the moist sand bordering the water,

and the newly-hatched young ones are short-tailed, and very sluggish. They shelter amongst the loose stones, the colour of which they closely match, being in shades of dull brown. On account of this protective coloration and slow movements they are not easily discerned, and thus escape many enemies. They do not enter the water at this stage, as, doubtless, they would be liable to be devoured by adults of their own species there. Dragon lizards are easily tamed, and, if handled frequently and gently, will not attempt to escape or bite. The teeth are small and blunt, and a bite from a large specimen would hardly amount to more than a pinch.—A. E. Rodda.

10th November, 1924.

"In the Botanic Gardens."—In this booklet, of about eighty pages, the author, the Hon. Frank Clarke, M.L.C., has written a chatty and appreciative description of our Melbourne Botanic Gardens, and the dozen illustrations by Sears increase the charm of the production. Whether residents of other States and countries will agree with one of his opening sentences remains to be seen. He says—"There is nothing to equal the Gardens in all Australia, nor in Europe either." Before beginning his pilgrimage of the Gardens the author gives a brief account of their establishment and history to date. Attention is called throughout to notable trees, plants, etc., and one of his best twelve is *Melalenca styphelioides*, the Prickly-leaved Tea-tree, of New South Wales, growing on the Princes' Lawn, where its white trunk, surmounted by plumes of small dark green foliage, makes a perfect picture. The author seems to prefer to write "ti-tree," which the late Prof. E. E. Morris, in "Austral-English," regarded as an erroneous spelling, and, moreover, without justification, as "tea-tree" is derived from the use to which the leaves of one or more of the Melalencas, and Leptospermums were put by sailors during the early voyages of discovery to Australia. The publication is admirably adapted for sending to friends at a distance, to give them some idea of the picturesqueness of the Gardens and their contents, or for overseas visitors to add to their collection of reminiscences of their travels. The author's enthusiasm is shown to the end, and his pleasant chat concludes thus:—"Our Botanic Gardens are the rarest thing in all broad, beloved Australia."

Wild Life on Mount Everest.—Our friend, Mr. A. E. Keep, during his visit to England has not forgotten the *Naturalist*, and its editor's troubles in securing short, interesting paragraphs. He sends a cutting from the *Times* (London), of 29th July last, in which Major R. W. G. Hingston records some of the fauna found at nearly 20,000 feet above sea-level. Man can exist without distress at 28,000 feet; a wild sheep, a small hare and other mammals are frequent at 17,000 feet. Snipe have been flushed at 15,000 feet. The redstart has been seen at 18,000 feet. Choughs have been seen flocking round a peak at 24,000 feet. Tibetans construct villages up to a height of 15,000 feet, beyond which they are unable to till the ground. At this height beetles may be found sheltering under stones. Even a colony of ants has been found, but both these insects exhibit signs of the intense cold, and hard conditions of the locality. Even butterflies and grasshoppers have been seen up to 17,000 feet. Pond-life also exists at 15,000 feet. Major Hingston concludes:—"Is there any portion of the earth's surface devoid of living creatures? . . . . Here in this most bleak and inhospitable region, far above the last traces of vegetable existence, living creatures spread themselves abroad over the white wilderness of snow and ice."

A Synopsis of the Vertebrate Animals of Tasmania: By Clive Lord, F.L.S., and H. H. Scott. Hobart: Oldham, Beddome and Meredith. 1924. 21/-. 340 pp. (5 x 8½).

This volume will be found useful by naturalists on both sides of Bass Straits, for many species recorded are found in Victoria as well as Tasmania. It deals with all forms of vertebrate life, from Lancelets to Bats, and includes a brief reference to the aboriginal inhabitants of Tasmania, now unfortunately extinct. A systematic list of the classes and orders is followed by brief notes about each species, sometimes accompanied by an illustration, such as an outline-drawing of the complete fish or animal, or, in the case of birds, the head only. Unfortunately, the volume lacks an index to the figures and plates, the latter not always being adjacent to the letterpress concerned. A glossary of terms used, and a brief outline of the geological succession of animal life, past and present, will be useful. An index of common names, and another of the classes and genera are included.

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The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria

Published 7th January, 1925

Hon. Editor: F. G. A. BARNARD, Esq.

The Author of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE.

BUSINESS PAPER FOR MONTHLY MEETING.

MONDAY EVENING, 12th JANUARY, 1925.

1. Correspondence and Reports.
2. Election of Members.

	PROPOSER	SECONDER
AS COUNTRY MEMBER—		
Dr. R. E. Shuter, Greendale, via Bacchus Marsh.	Dr. Sutton	Mr. F. G. Barnard
AS ASSOCIATE MEMBER—		
Miss Margaret Jeffrey, P.O., Molesworth.	Mr. T. C. Bryan	Mr. C. Oke

3. Nominations for Membership.
4. General Business.
5. Remarks by Exhibitors relative to their Specimens.
   Ten minutes' adjournment for discussion of Exhibits.
6. Reading of Paper and Discussion thereon.
   1. By Mr. A. L. Scott—"Some Victorian Holidays" (illustrated with lantern slides).

The committee will be pleased to receive promises of papers for future meetings.

7. Reading of Natural History Notes.
   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same, that he may arrange for their bringing them before the meeting; such notices should, however, be brief.
8. Exhibition of Specimens and Conversazione.
   Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Club year ended on 30th April last. Any subscriptions overdue should be forwarded to the Hon. Treasurer at once. Subscriptions for the year 1924-5 became due on 1st May.

SPECIAL NOTICE.—The attention of members is directed to item 8 of business paper. Notices of exhibits should, if possible, be type-written.

WILD FLOWER SHOW.

A few members have not yet sent in returns for tickets.

The Victorian Naturalist

Vol. XLI.—No. 9. JANUARY 7, 1925 No. 493

FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall on Monday, 8th December, 1924.

The President, Mr. J. Searle, occupied the chair, and about sixty members and visitors were present.

REPORTS.

A report of the excursion to Altona Bay on Saturday, 15th November, was given by the leader, Mr. A. E. Rodda, who reported an interesting afternoon, when attention was called to various aspects of natural history, silicified lignite being seen at the disused brown coal mine, quite a number of birds being noted in the coastal scrub, while a freshly-caught specimen of the Port Jackson shark afforded an opportunity for close inspection of its peculiar dentition.

A report of the excursion to the Botanic Gardens on Saturday, 22nd November, for pond life was given by the leader, Mr. J. Searle, who reported a fair attendance of members. He said that many forms of pond life were very abundant, but nothing of special interest had been noted.

A report of the excursion to Black Rock on Saturday, 6th December, was given by the leader, Mr. H. B. Williamson, F.L.S., who said that an instructive afternoon had been spent among the plants found only in the neighbourhood of a sea beach. Owing to the low tide, a large area of grass-wrack (Zostera) was exposed, and could be examined at leisure.

ELECTION OF MEMBER.

On a ballot being taken, Miss L. McMahon, Whitehorse Road, Mitcham, was duly elected an ordinary member of the Club.

GENERAL BUSINESS.

The President announced that Miss G. Nokes, a well-known member of the Club, was about to spent a short holiday in New Zealand, and on behalf of the members wished her *bon voyage*. It was decided to give Miss Nokes a letter of introduction to kindred societies in New Zealand.

The Hon. Librarian reported that he had received from various societies and institutions a number of parts of publications required to complete the series in the Club's library.

He also announced recent additions to the library, and requested members borrowing books to observe the library rules.

PAPERS READ.

1. By Mr. J. C. Goudie, entitled "Notes on the Coleoptera of North-Western Victoria." Part XII.

The author gave a list of the species of beetles belonging to the families Mordellidae, Cantharidae, Œdemeridae, and Curculionidae, which he observed in the Sea Lake district, the last-named family, which is very numerous throughout Australia, being represented by over one hundred species, some of which have not yet been identified.

Some remarks were made by Mr. F. G. A. Barnard (who read the paper in the absence of the author) and by Mr. C. Oke, who spoke of the value of Mr. Goudie's painstaking work on the beetles of his district.

2. By Mr. C. Daley, F.L.S., entitled, "Around Noojee."

The author gave some account of a week spent recently with Mr. J. W. Audas, F.L.S., among the hills and fern gullies of the Noojee district, situated in the Latrobe Valley, about thirty miles north of Warragul. Attention was called to the threatened spoilation of one of the beauty spots of the district known as Myrtle Bower, by the extension of a saw-mill tramway. A list of the trees and plants observed, numbering about two hundred and fifty, was appended.

The Chairman and Messrs. A. G. Brown, F. Pitcher, and E. E. Pescott, F.L.S., spoke as to the interest of the paper, and the need for more careful consideration of beauty spots by the Forest Department when authorising the construction of timber tramways.

NATURAL HISTORY NOTE.

Mr. P. R. H. St. John called attention to his exhibit of two species of Eucalyptus hitherto unrecorded for Victoria, which he had recently collected in the Mt. Toole-be-wong-Ben Cairn district. He also gave an account of a fight he had witnessed between two male Lyre Birds in the same locality.

EXHIBITS.

By Mr. C. Barrett, C.M.Z.S.—Two species of "Eyed" Elaters (click beetles), genus Alaus, from United States of America.

By Mrs. Coleman.—Flowers of following orchids:—*Cryptostylis longifolia*, from Blackburn, 8/12/24; *Pterostylis pusilla*, cultivated specimens grown at Blackburn, fourth time of flowering; *Pterostylis decurva*, from Fern Tree Gully, 7/12/24; *Pterostylis decurva*, albino form, found growing in the open in strong sunlight at Fern Tree Gully, 7/12/24.

By Mr. F. Cudmore.—Fossil teeth of extinct species of Cestracion Sharks from the rocks of Beaumaris. Four species represented, viz.: *Strophodus coccinicus*, Tate; *Cestracion cainozoicus*, Chapman and Pritchard; *C. longidens*, Chapman and Cudmore; and *C. Novo-Zealandicus*, Chapman. A species of Cestracion, the Port Jackson shark, is still living in Australian seas.

By Mr. J. E. Dixon.—Sixty-seven species of beetles collected at Gypsum Siding, and Lake Hattah, North-West Victoria; also specimens of "Kopi" from Gypsum Siding.

By Mr. C. French, junior.—Specimens of a scale insect, genus Pulvinaria, probably new to science. Collected at Kewell (Wimmera), by Mr. Jos. Hill.

By Mr. A. E. Rodda. Specimens of Silcified Lignita, showing minute quartz crystals; lower jaw, dorsal fins, spines, and egg-case of Port Jackson shark, collected on Altona excursion.

By Mr. A. L. Scott.—Photograph of Black Rock excursion party, and of White fronted Heron (in tree).

By Mr. P. R. H. St. John. Herbarium specimens of *Eucalyptus agglomerata*, Maiden, from Bunyip, 19th October, 1924, and from Mount Toole-be-wong, 5th December, 1924, unrecorded for Victoria; *Eucalyptus Blaxlandii*, Maiden, Blue Stringybark, from Ben Cairn, Millgrove, 5th December, 1924; juvenile foliage of Shining Gum, *Eucalyptus nitens*, Maiden, not before exhibited; *Blechnum laevigatum*, Cav., from Mount Toole-be-wong and Ben Cairn, 5th December, 1924, first record for Victoria.

By Mr. A. J. Tadgell.—Red Brome Grass, *Bromus rubens* (introduced), from Mt. William, near Lancefield, collected by exhibitor, November, 1924. Previously collected by exhibitor on the Keilor Plains and beyond Sunbury, 1923. This grass is closely allied to *Bromus Madritensis*, both species being of Mediterranean origin. Red Brome Grass differs from *B. Madritensis* in its pubescent stems, and dense ovoid purplish panicles, with very short branches, the purple heads giving it a very distinctive appearance when growing.

After the usual conversazione the meeting closed.

EXCURSION TO THE BRISBANE RANGES.

Only Messrs. Hooke and Miller joined the leader in the excursion to the Brisbane Ranges on 18th and 19th October, which, on account of perfect weather, was most enjoyable. To save time, the rather uninteresting eight and a half miles of very bad road between Bacchus Marsh and McPhail's was covered by car. From the latter place the road through the northern end of the Ranges was followed, and the billy was boiled for lunch at the usual picnicking spot at the big rock outcrop. At the farmhouse on the right, now deserted, the party turned south, passing to the east of the Beremboke settlement, and, after going somewhat astray, crossed Reilly's Creek, and arrived at Durdidwarrh just at dusk. Here accommodation was obtained by the kindness of Mr. Bradley, the caretaker of the Reservoir (Geelong's water supply), and on Sunday morning the walk was resumed. After passing through the water reserve between the road to Steiglitz and the aqueduct, and lunching below the lower dam, a course was taken along a track leading to the Steiglitz-Durdidwarrh Road, and then by another, which finally brought the party to the Meredith Road, about two and a half miles from the Moorabool River. At the river, tea was consumed by the light of the fire that boiled the billy, and the walk resumed in darkness until Meredith was reached at about 9.30. About 30 miles in all was covered, and the small party returned to town by the early train on Monday morning thoroughly pleased with the outing, and firmly resolved to repeat it next Spring.

For those who have not visited the locality, it may be stated that the Ranges, which are composed of slates and sandstones of Ordovician age, covered as to the southern half partly by gravel deposits, maintains an average height of about 1200 feet as far as Anakie, just surpassing 1400 feet at the highest point. From Anakie the height falls to about 600 feet at Maude, which may be said to mark their southern termination.

Separated from the basalt plains by gentle alluvial slopes, the abrupt eastern face of the Ranges, known as the Rowsley fault, runs almost due north and south, and is much dissected by small, gorge-like water courses, the most important of which are the main branch of the Little River debouching at Staughton Vale, and a smaller branch, the overflow from the Reservoir making its exit by the Anakie

Gorge. To the west, the surface passes into the Ballarat plateau.

In spite of the sterile nature of the ground, the rainfall of about 25 inches, well distributed throughout the year, conduces to a quite dense and varied vegetation, except in same of the steeper slopes where the taller growth is associated with the scantiest of ground flora.

About sixteen species of Eucalyptus, generally of quite moderate size, with occasional Casuarinas, Exocarpus and Acacias, compose the tree growth, with larger shrubs of Bursaria, Hymenanthera, Leptospermum, Cassinia, Hakea, Acacias (about thirteen in all), Dodonaea, Pomaderris and Callistemon. The total number of flowering plants and ferns probably amounts to about 400, and amongst them are many interesting species like *Olearia pannosa, O. ciliata, O. iodochroa* and *O. teretifolia, Helichrysum obtusifolium, Helipterum anthemoides, Acacia aspera, A. Mitchelli,* and *A. conniteornis, Bossiaea microphylla, Pultenaea humilis, P. laxifolia, Calytrix tetragona, Grevillea parviflora, G. floribunda, G. aquifolium* and *G. lanigera, Eriostemon obovalis, Boronia anemonifolia Pseudanthus divaricatissimus, Phyllanthus thymoides, Billardiera cymosa, Prostanthera denticulata, Pomaderris ferruginea,* and *P. prunifolia, Leucopogon glacialis* and *Choristemon humilis,* which are rarely or never seen so close to Melbourne.

At the north end of the Ranges the operations of woodcutters and the occurence of a fire in the previous year have altered the appearance of the vegetation. Gum saplings are growing thickly, and *Trachymene Billardieri* in particular, and a handsome, introduced species, *Selago corymbiflora,* with white flowers looking like an Umbellifer, but belonging to the Scrophulariaceae, are growing most abundantly.

In the water reserve the most noticeable and prevalent plants were *Dillwynia floribunda, Platylobium obtusangulum, Hibbertia stricta,* and *Tetratheca ericifolia,* all of which were in finer form than the writer had previously seen them. Still more prevalent, but not so noticeable, were the weedy *Haloragis tetragynia, Opercularia varia* and *Drosera auriculata,* and *Stackhousia linarifolia.* Of orchids, eighteen were noted out of about forty-three recorded, the most frequent being *Thelymitra antennifera, Caladenia testacea,* and *C. dilatata, Glossodia major,* and *Diuris longifolia.*

About the aqueduct the charming *Pultenaea pedunculata* covered wide areas with green mats adorned with bright

yellow flowers, and is suggested as being admirably adapted for hiding the bare rock in our railway cuttings.

The most notable find during the excursion was another Pultenaea, as yet undetermined by Mr. Williamson.

For further information about this interesting locality members are referred to the papers by the late Mr. O'Donoghue and Mr. St. John, which appeared in the Naturalist, Vol. XXVI, p. 151, and Vol. XXIX, p. 130.

AROUND NOOJEE.

By CHAS. DALEY, B.A., F.L.S.

Read before Field Naturalists' Club of Victoria, 8th December, 1924.

On Saturday, 25th October, Mr. J. W. Audas and myself left Melbourne by the early train, with the intention of spending a week in botanising in the vicinity of Noojee, an outpost of settlement at the junction of the Loch River with the Latrobe. At Warragul we were joined by another club member, Mr. A. G. Brown.

Noojee lies almost due north of Warragul in well-wooded mountainous country, about 27½ miles from the main Gippsland railway, and is reached by a cockspur line, the journey from Warragul taking three hours and a half, the speed of the train, including the happy-go-lucky stoppages at every embryo station *en route*, being nearly eight miles per hour. At one time this district was heavily timbered with towering Mountain Ash, *Eucalyptus regnans*, and Silvertop, *E. sieberiana*, but for many years axe and fire have been ceaselessly at work, and the once densely-clad hills have on every side been mercilessly denuded of their timber. "You *must* cut it down to get *grass*," said one farmer, in surprise at my expressions of regret at the passing of the forest. Grass, yes—and bracken, too—which, however, has one merit, it serves to keep the rich soil of the hills from being transported by the heavy rainfalls into the despoiled creeks and streams, which, once amid their fern gullies, were as beautiful as those of Fernshawe or Marysville. One tree, however, which escapes the spoiler's axe is the Blackwood, *Acacia melanoxylon*, the specimens of this tree throughout the whole district being especially large, shapely, and beautiful.

The question in the main is an economical one. Which is of the greater value to the State—Wise and careful conservation of forests providing abundant supplies of good timber for ages to come, and, whilst preserving the natural features, yielding also, as in old-world countries, a handsome revenue; or—complete denudation, with grass in plenty, dairy produce, fat cattle, potatoes, onions, bare hillsides beset with rain and wind, swollen streams, widespread silt deposits, frequent floods, climatic changes, and an ever-growing scarcity of timber? Is no happy medium possible? This problem suggests itself as we pass through the bare hills of the Neerim district, once famous for its forest giants, some of which were over 300 feet in height. The rich, volcanic soil and abundant rainfall produced prolific growth. Nearer to Noojee, at Nayook, the highest point on the line, 1413 feet above sea level is reached, some extensive and beautiful panoramic effects being now observed along the Latrobe and its contributor valleys, the finest being towards Mt. Toorongo and the Baw Baws. Approaching Noojee the heads of some of the valleys have been spanned by huge wooden trestle bridges, the longest of which, commanding a splendid view, is said to be 300 feet, and about 100 feet above the creek bed below. Near the head of the Tarago, not far from Nayook, is a beautiful fern-gully reserve which is much frequented by tourists. Along the course of the railway the vegetation had not been very striking, the most frequent plant in bloom being the Prickly Bush-Pea, *Pultenaea juniperina*, which is quite a handsome shrub, with a great profusion of showy flowers—in the mass quite "Old Gold" in hue. In some instances the foliage belied the name, being quite soft to the touch; in others, true to type. Coming nearer to Noojee, where original scrub was more evident, the common Cassinia, *C. aculeata*, with brownish bud clusters ready to bloom, and the Hop Goodenia, with its yellow flowers, grew abundantly; whilst at the top of the cuttings would occasionally come to view a delicately-tinted clump of Blue Dampiera, *D. stricta*, whilst more frequently the truly Handsome Flat-Pea, *Platylobium formosum*, made a pleasing show with its rich, red-tipped, yellow pea-flowers. The Wiry Bauera, *B. rubioides*, with flowers varying from white to pink, justified its name, sending its many wires down the sides of the cutting for a distance of eight or ten feet, suggesting that it might be planted elsewhere to advantage on bare sloping sides of

railway cuttings. The only Acacia with a lingering semblance of bloom was "Prickly Moses," *A. verticillata.* Crossing the heads of the valleys, the vegetation of the moister and more shaded places, such as Tea-trees, Hazel, Christmas-bush, and ferns, was noticeable. Noojee is situated near the junction of the Loch River with the Latrobe, in a low-lying swampy area, the railway station being placed half a mile further on. Some private residences are also built on the much higher hill sites above the railway line. Still in the somewhat primitive stage of settlement, Noojee shows signs of progress and growth.

At the railway station we parted from Mr. Brown, who was going to the Toorongo River, Mr. Audas and I driving about two miles up the Loch River to Mrs. Prescott's accommodation house. The road after recent rains, especially at the soaks from the hills, was boggy and rough. In front of the house are steep and high hills, partly timbered, partly cleared, at the foot of which flows the Loch River amid a prolific and varied growth of vegetation on either side. Behind the house is a parallel ridge of hills covered with scrub and forest growth. The road up the valley passes the house, and on the other side of the river is the tram line to the sawmills some miles further on. Our position was thus a good one for our investigations. Our first outing along the road convinced us that not many species of plants were in flower, but that those that were showed unusual profusion in bloom and richness in colouring. The under-scrub was a dense tangle overrun with Wiry Bauera, the Handsome Flat-Pea, and the Prickly Pultenaea, all in full luxuriance of growth. The Dusty Miller, *Spyridium parvifolium*, and occasionally the Golden Bush-Pea, *P. Gunnii*, the Blue Dampiera, and the ever-welcome "Pink Eye," *Tetratheca ciliata*, were also in flower. Crossing the river next day we climbed the steep hill to find that, as we left the river slope, the bracken covered the hillside to the exclusion of other plants. We followed the tram track round the foot of the hills to Peacock's Mill, finding a good variety of plants affecting a fluviatile area; rushes, sedges, and grasses of many kinds, among which might be mentioned the Tassel Cord-Rush, *Restio tetraphyllus*, whilst the Wire Grass, *Tetrarrhena stipoides*, proved an effective entanglement amidst the river vegetation, among which grew freely the Rough Tree-Fern, *Alsophila australis*, the King Fern, *Todea barbara*, and several species of Blechnum, the Coral

Fern, *Gleichenia circinnata*, the Common Maiden-Hair *Adiantum aethiopicum*, the Necklace Fern, *Asplenium flabellifolium*, the Common Bracken, *Pteridium aquilinum*, and allied species. Small ferns of several kinds, fungi and Club Moses grew freely in the porous soil in which the Blue Squill *Chamaescilla corymbosa*, Milkmaids, *Burchardia umbellata* the Tufted Lily, *Stypandra caespitosa*, a few Purple Flags, three species of Stellaria or Starwort, the Cut-leaf Crane's Bill, *Geranium dissectum*, Yellow Wood-Sorrel, *Oxalis corniculata*, and Bidgee Widgee, *Acaena sanguisorbae*, found congenial conditions for growth.

Along the river course grew the Black, the Early Black, and the Silver Wattles, Prickly Moses, and the Narrow-leaf Acacia, *A. linearis*, with many fine Blackwoods. The Scented Paperbark, *Melaleuca squarrosa*, was in full flower, and less seldom seen were the Swamp Paperbark, *M. ericifolia*, Manuka, *Leptospermum scoparium*, and the Woolly Tea-Tree, *L. lanigerum*. Two attractive shrubs in full wealth of flower were the Snow Daisy-Bush, *Olearia lyrata*, and the Truncate Phebalium, *P. bilobum*. In this rich, peaty soil, especially towards the Latrobe River, luxuriance in growth is seen in the vast number of young Eucalypts, mostly Common Peppermint, Mountain Grey Gum and White Mountain Ash (*E. australiana*, *E. goniocalyx*, and *E. regnans*), of Hazel, *Pomaderris apetala*, and of Christmas Bush, *Prostanthera lasianthos*, with graceful, slender, and straight trunks stretching in close array upwards to the sunlight. Among other plants noticeable, but not very frequent, were the White Elderberry, *Sambucus Gaudichaudiana*, the Common Correa, *C. speciosa*, and the handsome Mountain Correa, *C. lawrenciana*. Here also were two or three trees of the Mutton-Wood, *Rapanea (Myrsine) variabilis*. At Peacock's Sawmill, on the Latrobe, we found that most of the timber from the White Mountain Ash, *E. regnans*, was being sawn at present for fruit cases. In conversation with one of the employees, who had a good knowledge of bush flora and fauna, he referred to a clustering specimen of *Clematis aristata* as "Woodbine," a vernacular name which seems appropriate. He also showed us some fine specimens of figured Blackwood. Crossing the river on a fallen tree, we passed uphill over the tramway line to the scrub above the cutting, the chief botanical features of which have been mentioned. Bauera, Platylobium, Senecio and Dampiera were especially fine. On this slope grew the

"Grass Trigger-Plant," *Stylidium graminifolium*, the Bent Goodenia, *G. geniculata*, the Austral Bluebell, *Wahlenbergia gracilis*, and Tall Lobelia, *L. gibbosa*. We returned by the road, noting a fine festoon of Clematis on the way.

In a later walk along a disused tram line by the river towards Noojee the luxuriance of growth was equally marked. A schoolboy joined us, who gave us the name of "Bootlace Plant" for the Tough Rice-flower, *Pimelea axiflora*, the strong fibrous bark being used in default of laces or string. This was plentiful, as also the Tall Rice-flower, *P. ligustrina;* and the Scrub Nettle, *Urtica incisa*, made its presence distinctly felt. Sweet Bursaria, *B. spinosa*, had not yet sent out its creamy blooms. We noticed both Purple and Common Appleberry, *Billardiera longiflora* and *B. scandens*, in fruit, and the Wonga Vine, *Tecoma australis*. A much more robust climber was the Twining Silk-pod, *Lyonsia straminea*, with its vegetable cables. Humbler moisture-loving plants such as Water Milfoil, *Myriophyllum intermedium*, the Hairy Willow-Herb, *Epilobium junceum*, the Yellow Marsh-flower, *Villarsia uniformis*, the Green Ground-Berry, *Achrotriche serrulata*, Brooklime, *Gratiola peruviana*, Broom Spurge, *Amperea spartioides*, the Common and the River Buttercups, *Ranunculus lappaceus*, and *R. rivularis*, were abundant, whilst the lowly Violets, *V. hederacea*, and *V. sieberiana*, frequently grew in spreading mats over a considerable space. Introduced plants are not as yet very numerous. Quite at home and rather a striking plant in a ferny glade grew a new arrival in Victoria—the Himalayan Honeysuckle, *Leycesitra formosa*.

On the ranges behind the house, amid the Eucalypts, were found a few late flowers of Common Heath, *Epacris impressa*, also a restricted patch of the Yellow Hakea, *H. nodosa*, whilst the Holly Lomatia, *L. ilicifolia*, which is well distributed, had for company the less frequent Tree Lomatia, *L. Fraseri*. The Prickly Geebung, *Persoonia juniperina*, was also in fruit. The Cherry Ballart, *Exocarpus cupressiformis*, seemed to grow better on this side of the river. A few flowers of the Blue Pincushion, *Brunonia australis*, were seen, and, restricted to a small area, was a colony of the Wrinkled Daisy-bush, *Olearia rugosa*, with beautiful and attractive spraying blooms. Also on this area we secured five specimens of the Great Sun Orchid, *Thelymitra grandiflora*. The season seemed over for orchids, not even a Glossodia or Diuris being seen.

A day was spent in visiting the upper part of the Loch valley, Mrs. Prescott kindly arranging to drive us up. A well-constructed tram line follows the course of the stream for some miles on the right bank with a twofold divergent track from the left side of the stream. The engine and the bodies of the trucks on this line were at one time part of the equipment of the railway from Sorrento, plying to the Back Beach with holiday makers, now truly rusticating in the forest country in far other, but still useful, employment.

Passing up the Loch valley some fine holdings are seen, most of the big timber having been cut out. The inner flats and slopes are under cultivation or used for dairying occupations. A few miles up the granite outcrops are more clearly defined. The road in places is bad, and at certain spots of the consistence of glue. Leaving the trap at the Loch River school, we pursued the way on foot, then passed over the river to the sawmills, at which little work was being done, pending permission to cross the Loch River into the forest beyond. Before resuming, we lunched, and then followed the tram track, a delightful walk, until it crossed the river into the Myrtle Bower. The character of the vegetation here is something like that of the Marysville streams, but more dense. In approaching the river, the tram track had, of necessity, to be cleared, blackwood and myrtle-beech trees of considerable size having been cut down. A large tiger snake on the line, startled at our coming, got safely away into the debris of fallen timber. The line at present ends a few yards over the river. It is a great pity that to reach the timber available for cutting beyond the river the area forming the Myrtle Bower has to be entered, for, admitting the charm of an old timber track in mountainous country, and the beauty with which nature in time seeks to repair the ravages of man, it is regretable that places with such interesting and distinctive types of vegetation cannot be kept in their pristine state, untouched by the spoiler's hand.

The Myrtle Bower extends some distance up towards Petschack's selection, and on each side of the river. In the moist and peaty soil there is a luxuriant growth. The Myrtle-beeches, *Nothofagus Cunninghamii*, are exceedingly fine, sometimes fantastic in the shape of their boles and lofty trunks, adorned with mosses, lichens and epiphytal ferns. The light-green leaves of spring at the tips of each branch of dark-green leaves added to their attractiveness.

Alsophilas, Todeas, and most of our gully ferns grew profusely amid the usual thickets of hazel, musk, christmas bush, acacias, sassafras, blanket-leaf, *Bedfordia salicina*, and supple-jack, characteristic of the mountain streams' flora.

Also in association, but much less numerous, were Elderberry Panax, *Tieghemopanax sambucifolius*, the Sand-fly Zieria, *Z. Smithii*, the Privet Mock-Olive, *Notelaea ligustrina*, and the Small-leaf Bramble, *Rubus parvifolius*, whilst Mountain Correa, *P. Lawrenciana*, an occasional Mutton-wood, the Prickly Currant-Bush, *Coprosma Billardieri*, and the Rough Coprosma, *C. hirtella*, were represented; and the Banyalla, *Pittosporum bicolor*, with pleasing foliage and yellow bloom was noticed.

Under the shelter of this vegetation, in and upon it, and under our feet, also on rocks and stems, grew the smaller, but not less interesting, flora of the moisture and shade-loving plants, in conjunction with mosses and ferns forming an effective green mantle. The chief eucalypts were Mountain Ash, Mountain Grey Gum, Messmate and Silver-top. The only other orchids obtained were the Large Helmet-Orchid, *Corysanthes pruinosa*, and the Common Bird-Orchid, *Chiloglottis Gunnii*, both at Myrtle Bower. After spending as much time as possible in viewing the beauties of this attractive river flora and the ever-sparkling stream, we reluctantly returned along the tram track past the sawmill. A somewhat overgrown tourist track passes through the Myrtle Bower country, and connects with a track past Petschack's abandoned selection over the divide and along Alderman's Creek to Walsh's Creek in the Yarra valley, an interesting excursion for walkers and travellers. Returing to our trap, we were in time to see the schoolmaster killing a copperhead snake. On starting out, Mr. Audas had previously killed one which was on the track. Being desirous to see the Toorongo River Valley, we drove through the town of Noojee over a fine stretch of road, passing a sawmill at work, and also the Hydro-electric station which illuminates the townships of Noojee, Neerim and Warragul. The water power is brought for a few miles by an open channel along the hillsides from the foot of the Toorongo River Falls to the plant where the electric power is generated. The Toorongo River valley is deep, fertile and narrower than the Loch. Not far from the road we met Mr. A. G. Brown, who has a fine property, including hill slopes and alluvial flats, through which the

river flows. We were interested in seeing the luxuriant growth of the introduced Water Meadow-grass, *Poa aquatica*, which has firmly established itself as an effective agent in reclaiming swampy land, as well as providing a good fodder for stock. As a result, the roots of the grass are now in demand, and widely distributed for planting in swampy areas.

From Mr. Brown's residence, and under his guidance, we ascended the hill slopes as far as the water-race, along which we proceeded a considerable distance, the hills having a good forest growth of Messmate, Silvertop, and Peppermint, with a little Mountain Grey Gum and Yellow Stringy-bark, also Black and Early-black Wattles, Blackwoods, Varnish Wattle, *Acacia verniciflua*, and Prickly Moses. The scrub vegetation was similar to what has been described. At one place an unusual number of tree-fern trunks had healthy blackwoods, and in one instance a Banyalla, growing from them. A fine prospect of this picturesque valley was obtained, with the road going away over the hills towards the Fumina country. The valley is mostly cleared, but the Swamp Gum, *E. ovata*, and the Manna Gum, *E. viminalis*, grow on the flats. Along the watercourse, here and there, as on the slopes to the Loch River, we were struck with the unusual growth of the Giant Mountain-Grass, *Glyceria dives*, to a height of seven or nine feet. As it germinates rapidly after a forest fire, frequently valuable timber has been burned by the settlers and others to encourage its growth for feeding stock; although without the protection of the forest the grass would soon disappear. The Tree Everlasting, *Helichrysum ferugineum*, grew well along the water channel, and we were interested in observing that the Common Cassinia gave evidence of heteraphylly. In some plants its leaves broadened and appeared to imitate closely the foliage of the Helichrysum.

Rabbits and wombats are found along the watercourse. Here, as in the Loch gullies, we heard the Lyre-bird calling, and saw traces of its presence in numerous scratchings. From the race we went to the valley road past some comfortable homesteads, and, on a well-chosen spot overlooking the stream, and commanding a fine view of the valley, with towering hills shutting it in on either side, we reached the accommodation house, our destination for the night. After lunch, Mr. Brown left us, and then with Mr. Richards, who

has the oversight of the watercourse, we started for the Falls.

As the result of long periods of surface denudation, the underlying granite, which had come into view in the valley, was now freely exposed in mass in the composition of the range. A pleasant walk along a track by the race, and above the river course, skirting a forest-clad hill, led to the foot of the Falls. Up from this valley, into which trickled or ran the water from a thousand rills, came with every breath of wind that subtle bush fragrance from "the Censers of the Mountain Musk." The attractive Snow Daisy-bush, with masses of white flowers, and the yellowish tinge of the new foliage on the Blackwoods, relieved the darker verdure bordering the river. Among many species of grasses, Tussock grass, *Poa caespitosa*, Wallaby grass, *Danthonia penicillata*, and Weeping grass, *Microlaena stipoides*, are evident. On the track an intrusive dioritic dyke came through the granite. The watercourse is patrolled regularly, trees and boulders sometimes falling athwart or in the stream. From the foot of a series of cascades, crossing a rustic bridge, we made our way through a dense thicket of gully vegetation to the Toorongo Falls, a strong body of water precipitating itself over huge granite boulders. This is undoubtedly one of the finest water-falls in our State. Climbing higher with some difficulty, we reached the top of the Falls, the stream coming steadily out from the elevated plateau beyond. Retracing our steep course, we turned up near the little chalet, to the other branch of foaming cascades swiftly rushing in and among the rounded granite boulders, the spray constantly falling on rocks, logs and tree-trunks, stimulating to active growth all the minute forms of vegetable life, which love such conditions and vivify the scene with their emerald hue. Higher up in this gorge are the Amphitheatre Falls, forming a fine picture, the dense vegetation from lowly mosses, lichens, fungi, ferns, to overshadowing trees, providing a beautiful setting for the swirling water hurrying amid granite boulders smoothed and rounded by constant attrition.

Beyond the Toorongo Valley lie forests of Mountain Ash, through which little-known tracks lead to the Baw Baw Plateau, not yet accessible to the ordinary tourist; but just as the railway has opened up the Noojee forest country, from its terminus a new road is being built onward, a

probable precursor of extended railway facilities into the fair valley of Toorongo and the heart of remote Fumina. The Toorongo rises to the east of Mt. Horsfall, where the big timber still exists, and east of it is the basin of the Tangil, draining also to the Latrobe. Although the geological features vary through this area, Ordovician or Silurian measures resting or abutting on the granite, and rich, volcanic soils derived from ancient lava flows overlying, as in many parts of Gippsland, the ranges, there is nowhere any marked difference in vegetation, for the areas insensibly replace each other, and the resultant soil, mostly of volcanic origin, is so rich that with so copious a rainfall differences in flora can hardly be found as in drier areas.

Up the Toorongo River birds seem to be numerous and tuneful; King Parrots, Lories, and other parrots flashed here and there. The Gang Gang, Sulphur-crested, and Black Cockatoos were seen. The Satin Bower-birds are sometimes very numerous in the Loch Valley, and the more common birds, including the Coachwhip Bird and the Harmonious Thrush, are in full song. The Bell Miner, which one would expect to find on these streams, was not noticed, although numerous on the Lower Latrobe River.

In both rivers there is good trout fishing, and crayfish are unusually large. Leaving our pleasant halting-place at Toorongo, and its ever-running waters, we took a track leading over the race straight upwards, with hardly a deviation, to a road 1000 feet above us. It was partly overgrown with bracken and greasy under foot, and in consequence was a stiff climb, necessitating many spells.

Reaching the goal of our efforts—a bush road—we left it to head another uncertain track downward to the Loch Valley, which led us into an area, where, after a warm struggle through intervening, high and dense stretches of bracken, we reached a sawmill not very far distant from our destination.

Next morning we left Noojee by the early train, took our last look from the lofty trestle bridge at the favoured valley, and returned home after a very pleasant and interesting excursion in this fertile district, in which the tourist and nature-lover alike can find much to occupy their time and attention as well as to minister to their pleasure.

This district was the scene of a Club excursion at Christmas, 1919, and a report of the visit will be found in the *Naturalist* for March, 1920 (Vol. XXXVI, p. 153).

In view of the recent changes in many specific names, and the addition of vernaculars for all our plants, I have thought that the following list of the plants seen during the trip may be found useful:—

LIST OF PLANTS COLLECTED OR OBSERVED.

*Plants marked * were in flower; those marked † in fruit.*

FILICALES.

Trichomanes venosum, R.Br., Bristle Fern.
Hymenophyllum tunbridgense, Sm., Tunbridge Filmy Fern.
Alsophila australis, R.Br., Rough Tree Fern.
Dryopteris decomposita, Ktze., Shiny Shield Fern.
Polystichum aculeatum, Schott., Common Shield Fern.
P. adiantiforme, J.Sm., Leathery Fern.
Davallia dubia, R.Br., Rainbow Fern.
Lindsaya linearis, Sw., Screw Fern.
Asplenium flabellifolium, Cav., Necklace Fern.
Pleurosorus rutifolius, Fee., Blanket Fern.
Blechnum cartilagineum, Sw., Gristle Fern.
B. pattersonii, Mett., Strap Fern.
B. discolor, Keys., Fishbone Fern.
B. capense, Schl., Soft Water Fern.
B. Lanceolatum, Sturm., Lance Fern.
B. fluviatile, Lowe, Ray Water-Fern.
Pellaea falcata, Fee., Stickle Fern.
Cheilanthes tenuifolia, Sw., Rock Fern.
Adiantum aethiopicum, L., Common Maiden Hair.
Pteris umbrosa, R.Br., Shade Brake Fern.
P. tremula, R.Br., Tender Bracken Fern.
Histiopteris incisa, J.Sm., Batswing Fern.
Pteridium aquilinum, Kuhn, Common Bracken.
Polypodium Billardieri, C.Chr., Finger Fern.
P. grammitidis, R.Br., Gipsy Fern.
P. pustulatum, Forst., Kangaroo Fern.
Gleichenia circinnata, Sw., Coral Fern.
G. laevigata, Hook, f., Fan Fern.
Todea barbara, Moore, King Fern.

LYCOPODIACEÆ.

Tmesipteris tannensis, Bernh., Fern Club-moss.

SELAGINELLACEÆ.

*Selaginella uliginosa, Spr., Swamp Club-moss.

GRAMINEÆ.

Imperata cylindrica, Beauv., Blady Grass.
*Themeda triandra, Fort., Kangaroo Grass.

*Setaria viridis, Beauv., Green Pigeon Grass.
*Microlaena stipoides, R.Br., Weeping Grass.
*Tetrarrhena Juncea, R.Br., Wire Grass.
*Stipa pubescens, R.Br., Tall Spear Grass.
*S. setacea, R.Br., Corkscrew Grass.
*S. semibarbata, R.Br., Fibrous Spear Grass.
*Echinopogon ovatus, Beauv., Hedgehog Grass.
*Calamagrostis quadriseta, Spreng., Reed Bent Grass.
*Dichelachne crinita, Hook. f., Long-Hair Plume Grass.
*Danthonia penicillata, F.V.M., Wallaby Grass.
*Pappophorum nigricans, R.Br., Niggerheads.
*Phragmites communis, Trin., Common Reed.
*Eragrostis Brownii, Nees., Common Love Grass.
Glyceria dives, F.V.M., Giant Mountain Grass.
G. fluitans, R.Br., Manna Grass.
*Agropyrum scabrum, Beauv., Common Wheat Grass.

CYPERACEÆ.

*Cyperus Eragrostis, Vahl., Dark Leaf Rush.
*C. rotundus, L., Nut Grass.
*C. lucidus, R.Br., Common Leaf Rush.
*Heleocharis acuta, R.Br., Common Spike Rush.
*Scirpus inundatus, Poir., Swamp Club Rush.
*Schoenus apogon, Roem. and Sch., Fluke Bog Rush.
*Cladium glomeratum, R.Br., Soft Twig Rush.
*Gahnia Radula, Bth., Thatch Saw Sedge.
*G. psittacorum, Labill, Brickmaker's Sedge.
*Carex inversa, R.Br., Knob Sedge.
*C. Gaudichaudiana, Kth., Tufted Sedge.
*C. appressa, R.Br., Tall Sedge.
*C. pseudo-cyperus, L., Galingale Sedge.

LEMNACEÆ.

Lemna minor, L., Common Duckweed.

RESTIACEÆ.

*Restio tetraphyllus, Labill., Tassel Cord Rush.
*Leptocarpus Brownii, Hook, f., Coarse Twine Rush.
*Hypolaena lateriflora, Bth., Spreading Rope Rush.

JUNCACEÆ.

*Luzula campestris, Dc., Field Wood Rush.
*Juncus planifolius, R.Br., Broad Leaf Rush.
*J. bufenius, L., Toad Leaf Rush.
*J. polyanthemos, Buch., Common Leaf Rush.
*J. pauciflorus, R.Br., Loose Flower Rush.

LILIACEÆ.

*Burchardia umbellata, R.Br., Milkmaids.
*Chamaescilla corymbosa, F.V.M., Blue Squill.
*Stypandra caespitosa, R.Br., Tufted Lily.
*Lomandra longifolia, Labill., Long Mat Rush.

*L. filiformis, Britten, Wattle Mat Rush.
Xanthorrhoea minor, R.Br., Small Grass Tree.

IRIDACEÆ.

*Libertia pulchella, Spr., Pretty Grass Flag.
*Patersonia glauca, R.Br., Short Purple Flag.
*P. longiscapa, Sweet., Long Purple Flag.

ORCHIDACEÆ.

*Thelymitra grandiflora, Fitz., Great Sun Orchid.
Chorysanthes pruinosa, K.Cunn., Large Helmet Orchid.
*Chiloglottis Gunnii, Lindl., Common Bird Orchid.

FAGACEÆ.

Nothofagus Cunninghamii, Oerst., Myrtle Beech.

URTICACEÆ.

*Urtica incisa, Poir., Scrub Nettle.
*Parietaria debilis, G. Forst., Forest Pellitory.

PROTEACEÆ.

†Hakea nodosa, R.Br., Yellow Hakea.
Lomatia ilicifolia, R.Br., Holly Lomatia.
L. Fraseri, R.Br., Tree Lomatia.
†Persoonia juniperina, Labill., Prickly Geebung.

SANTALACEÆ.

Exocarpus cupressiformis, Labill, Cherry Ballart.

CARYOPHYLLACEÆ.

*Stellaria pungens, Brong., Prickly Starwort.
*S. flaccida, Hook, Forest Starwort.
*S. multiflora, Hook, Many-Flowered Starwort.

RANUNCULACEÆ.

*Clematis aristata, R.Br., Clematis.
*C. microphylla, D.C., Small Clematis.
*Ranunculus lappaceus, Sm., Common Buttercup.
*R. rivularis, Banks and Sol., River Buttercup.

MONIMIACEÆ.

*Hedycarya angustifolia, A. Cunn., Austral Mulberry.
Atherosperma moschatum, Labill., Southern Sassafras.

LAURACEÆ.

†Cassytha melantha, R.Br., Large Dodder Laurel.

CRUCIFERÆ.

*Cardamine dictyosperma, Hook, Forest Bitter Cress.

CRASSULACEÆ.

*Crassula Sieberiana, Ostenf., Austral Stonecap.
*C. macrantha, Diels and Pritz, Rufous Stonecrop.

SAXIFRAGACEÆ.

*Bauera rubioides, Andr., Wiry Bauera.

PITTOSPORACEÆ.

*Pittosporum bicolor, Hook, Banyalla.
*†Marianthus procumbens, Bth., White Merianth.
†Bursaria spinosa, Cav., Sweet Bursaria.
†Billardiera longiflora, Labill., Purple Appleberry.
*B. scandens, Sm., Common Appleberry.

ROSACEÆ.

*Rubus parviflorus, L., Small-Leaf Bramble.
*Acaena ovina, A. Cunn., Sheeps' Burr.
*A. sanquisorbae, Vahl., Bidgee Widgee.

LEGUMINOSÆ.

†Acacia diffusa, Edwards, Spreading Acacia.
*A. decurrens, Willd., Early Black Wattle.
†A. dealbata, Link., Silver Wattle.
†A. linearis, Sims, Narrow Leaf Acacia.
†A. melanoxylon, R.Br., Blackwood.
A. mollissima, Willd., Black Wattle.
A. pycnantha, Bth., Golden Wattle.
†A. verticillata, Willd., Prickly Moses.
†A. verniciflua, A. Cunn., Varnish Acacia.
*Pultenaea Gunnii, Bth., Golden Bush-Pea.
*P. juniperina, Labill., Prickly Bush-Pea.
*Platylobium formosum, Sm., Handsome Flat Pea.
*Bossiaea prostrata, R.Br., Creeping Bossea.
Goodia lotifolia, Salisb., Golden Tip.
†Glycine clandestina, Wendl., Twining Glycine.

GERANIACEÆ.

*Geranium dissectum, L., Cut-Leaf Crane's Bill.

OXALIDACEÆ.

*Oxalis corniculata, L., Yellow Wood Sorrel.

RUTACEÆ.

*Zieria Smithii, Andr., Sandfly Zieria.
Phebalium bilobum, Lindl., Truncate Phebalium.
*Correa speciosa, Andr., Common Correa.
*C. Lawrenciana, Hook, Mountain Correa.

TREMANDRACEÆ.

*Tetratheca ciliata, Lindl., Pink Eye.

POLYGALACEÆ.

*Bredemeyera volubile, Ched., Love Creeper.
*B. ericinum, Ched., Heath Milkwort.

EUPHORBIACEÆ.

*Amperea spartioides, Brongn., Broom Spurge.

RHAMNACEÆ.

*Pomaderris apetala, Labill., Hazel Pomaderris.
*Spyridium parvifolium, F.V.M., Dusty Miller.

MALVACEÆ.

*Plagianthus pulchellus, A. Gray, Common Hemp Bush.

GUTTIFERÆ.

*Hypericum japonicum, Thunb., Small St. John's Wort.

VIOLACEÆ.

*Viola hederacea, Labill., Ivy-Leaf Violet.
*V. Sieberiana, Spreng., Tiny Violet.

THYMELEACEÆ.

*Pimelea axiflora, F.V.M., Tough Rice Flower.
†P. ligustrina, Labill., Tall Rice Flower.

MYRTACEÆ.

†Eucalyptus australiana, Baker and Sm., Common Peppermint.
†E. goniocalyx, F.V.M., Mountain Grey Gum.
†E. Muelleriana, Howitt, Yellow Stringybark.
†E. obliqua, L'Herit., Messmate Stringybark.
†E. ovata, Labill., Swamp Gum.
†E. regnans, F.V.M., White Mountain Ash.
†E. Sieberiana, F.V.M., Silver Top.
†E. viminalis, Labill., Manna Gum.
†E. elaeophora, F.V.M., Long-Leaf Box.
*Leptospermum scoparium, R. and G. Forster, Manuka.
*L. lanigerum, Sm., Woolly Tea Tree.
*Melaleuca squarrosa, Donn., Scented Paper Bark.
*M. ericifolia, Sm., Swamp Paper Bark.

ŒNOTHERACEÆ.

*Epilobium junceum, G. Forst., Hairy Willow Herb.

HALORAGEÆ.

*Haloragis tetragyna, Hook, f., Poverty Raspwort.
*H. teucroides, P. DC., Germander Raspwort.
*Myriophyllum intermedium, DC., Water Milfoil.

ARALIACEÆ.

Tieghemopanax, sambucifolius, Viguer, Elderberry Panax.
*Astrotricha ledifolia, DC., Star-hair.

UMBELLIFERÆ.

*Hydrocotyle vulgaris, L., Common Pennywort.
*H. geranifolia, F.V.M., Forest Pennywort.

EPACRIDACEÆ.

†Astroloma humifusum, R.Br., Cranberry Heath.
†Acrotriche serrulata, R.Br., Green Ground Berry.
†Epacris impressa, Labill., Common Heath.

MYRSINACEÆ.

Rapanea variabilis, Mez., Muttonwood.

OLEACEÆ.

†Notelaea ligustrina, Vent., Privet Mock-Olive.

LOGANIACEÆ.

†Mitrasacme pilosa, Labill., Hairy Mitrewort.

GENTIANACÆ.

*Sebaea ovata, R.Br., Yellow Centaury.
*Erythraea australis, R.Br., Austral Centaury.
*Villarsia reniformis, R.Br., Yellow Marsh-Flower.

APOCYNACEÆ.

†Lyonsia straminea, R.Br., Twining Silkpod.

CONVOLVULACEÆ.

*Dichondra repens, R. and G. Forster, Kidneyweed.

BORRAGINACEÆ.

*Myosotis suaveolens, Poir., Sweet Forget-me-not.

LABIATÆ.

*Mentha laxiflora, Bth., Forest Mint.
*M. saturejoides, R.Br., Creeping Mint.
*Brunella vulgaris, DC., Self-heal.
Prostanthera lasianthos, Labill., Christmas Bush.

SOLANACEÆ.

†Solanum xanthocarpum, Schr., Toothed Nightshade.

SCROPHULARIACEÆ.

*Mimulus repens, R.Br., Creeping Monkey Flower.
*Gratiola peruviana, Lindl., Brooklime.
*Veronica calycina, R.Br., Cup Speedwell.

BIGNONIACEÆ.

*Tecoma australis, Wonga Vine.

RUBIACEÆ.

Coprosma Billardieri, Hook, f., Prickly Currant Bush.
C. hirtella, Labill., Rough Coprosma.

CAPRIFOLIACEÆ.

Sambucus Gaudichaudiana, DC., White Elderberry.

CAMPANULACEÆ.

*Lobelia gibbosa, Labill., Tall Lobelia.
*Wahlenbergia gracilis, A. DC., Austral Bluebell.

GOODENIACEÆ.

*Goodenia ovata, Sm., Hop Goodenia.
*G. geniculata, R.Br., Bent Goodenia.
*G. lanata, R.Br., Trailing Goodenia.
*Dampiera stricta, R.Br., Blue Dampiera.

BRUNONIACEÆ.

Brunonia australis, Sm., Blue Pincushion.

STYLIDIACEÆ.

*Stylidium graminifolium, Sw., Grass Trigger Plant.

COMPOSITÆ.

Clearia argophylla, F.V.M., Musk-Daisy Bush.
*C. lyrata, Hutch., Snow-Daisy Bush.
C. myrsinoides, F.V.M., Silky-Daisy Bush.
*C. rugosa, Hutch., Wrinkled-Daisy Bush.
*Lagenophera Billardieri, Cass., Blue Daisy Bush.
*Cotula coronopifolia, L., Water Buttons.
*Cassinia aculeata, R.Br., Common Cassinia.
Helichrysum ferrugineum, Less., Tree Everlasting.
*H. apiculatum, DC., Common Everlasting.
*H. obcordatum, F.V.M., Grey Everlasting
*H. scorpioides, Labill., Curling Everlasting.
*H. semipapposum, DC., Clustered Everlasting.
*Gnaphalium japonicum, Thunb., Common Cudweed.
*G. luteo-album, L., Jersey Cudweed.
*G. purpureum, L., Purple Cudweed.

*Erechtites prenanthoides, DC., Shrubby Fireweed.
*E. arguta, DC., Rough Fireweed.
*E. quadridentata, DC., Cotton Fireweed.
*Senecio lautus, Sol., Variable Groundsel.
*S. vagus, F.V.M., Saw Groundsel.
*S. velleoides, A. Cunn., Forest Groundsel.
*S. dryadeus, Sieb., Fireweed Groundsel.
S. odoratus, Horn., Scented Groundsel.
*Bedfordia salicina, DC., Blanket-Leaf.
*Cymbonotus Lawsonianus, Gaud., Austral Bear's Ear.
*Microseris scapigera, Sch. Bip., Yam.

ALIEN PLANTS RECORDED AS NATURALISED IN VICTORIA.

Anagallis arvensis, Pimpernel.
Anthoxanthum odoratum, L., Scented Vernal Grass.
Briza maxima, L., Shell Grass.
Calandrinia caulescens, H.B. and K., Purple Calandrinia.
Carduus lanceolatus, Scep., Spear Thistle.
Chrysanthemum leucanthemum, L., Ox-eye Daisy.
Cryptostemma calendulaceum, L., R.Br., Cape-Weed.
Dactylis glomerata, Cocksfoot Grass.
Festuca bromoides, Brome Grass.
Holcus lanatus, L., Yorkshire Fog Grass.
Leycestria formosa, Wallich, Himalayan Honeysuckle (New introduction to Victoria).
Lolium perenne, L., Rye Grass.
Mentha Pulegium, L., Pennyroyal.
Nasturtium officinale, R.Br., Water-Cress.
Paspalum distichum, L., Golden Crown Grass.
Plantago lanceolatus, L., Ribwort Plantain.
Trifolium minus, Rel., Slender Clover.
Vicia sativa, L., Vetch, or Tare.
Rubus fruticosus, L., Blackberry.
Rumex Acetosella, L., Sorrel Weed.
Ranunculus muricatus, L., Sharp-pointed Crowfoot.
Silene gallica, L., French Catchfly.
Papaver hybridum, L., Wild Poppy.
Erodium cicutarium, L'Herit., Stork's Bill.
Agropyrum repens, Beauv., English Couch, or Quitch Grass.

Another Day on Mount Disappointment.—When I saw recently that the people of Upper Plenty had opened up a track from their district to the summit of Mount Disappointment, and that, in connection with the Hume and Hovell celebrations, they proposed to make a big excursion to the top, I felt that I should like to join them, as I had some fourteen years before succeeded in reaching the top from a different starting point. On that occasion, which was the subject of a short paper in the *Naturalist* for April, 1911 Vol. XXVII., p. 228), I was accompanied by two other members of the Club, and we fought our way up mostly through bracken as high as ourselves, from the Toorourrong Reservoir, about three miles north of Whittlesea. We found little reward for our exertions, as a perusal of the paper will show. My starting place on this occasion was the end of the road which runs up the valley of Bruce's Creek, on the eastern side of the creek, and distant about five miles easterly from Wallan. This time a party of about seventy-five attempted the trip, and most of them succeeded in reaching the highest point, 2631 feet above sea-level, but as our starting point had an elevation of about 1000 feet, the climb, when spread over a distance of about five miles, was not very strenuous. Neither did it reveal any remarkable points of interest. The way was mostly through the State Forest Reserve, and advantage was taken of the extensive series of fire-breaks, which have been cut for the purpose of forest protection. Towards the summit some planting of *Pinus insignis* have been made, but they are not making much headway. From the giant tree-stumps seen from about 2000 feet upwards, some immense trees must have existed on the rich granite soil years ago, their trunks having been converted into palings and other building material, but few living specimens now remain. To the advantage of the tourist, water is procurable at two or three spots. The view from the summit on Saturday, 6th December, was obscured by clouds, especially to the south. It had been my intention to visit some falls on Bruce's Creek the following day, but as the day promised to be very fine I changed my mind, and repeated the climb to Mount Disappointment, this time getting a fairly good panoramic view, but the plateau-like summit does not provide a good vantage-point. The only flowering shrub of interest was the Balm Mint-bush *Prostanthera melissifolia*, which occurs sparingly on the northern slope during the last two hundred and fifty feet; its flowering season was, however, nearly over.—F. G. A. Barnard.

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— OF —

The Field Naturalists' Club of Victoria

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The Author? of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING.

MONDAY EVENING, 9th FEBRUARY, 1925.

1. Correspondence and Reports.
2. Election of Members.

AS ORDINARY MEMBERS—	PROPOSER:	SECONDER:
Miss A. Robertson, Presbyterian Ladies' College, East Melbourne.	Mr. F. Chapman, A.L.S.	Mr. F. G. A. Barnard
Mr. Harold R. Clark, 27 Moorehouse Street, East Camberwell.	Mr. C. Barrett, C.M.Z.S.	Mr. C. Oke.
Mr. J. de L. Forth, 476 Collins Street, Melbourne.	Mr. C. Barrett, C.M.Z.S.	Mr. C. Oke.

3. Nominations for Membership.
4. General Business.
5. Remarks by Exhibitors relative to their Specimens.
   Ten minutes' adjournment for discussion of Exhibits.
6. Reading of Paper and Discussion thereon.
   By Messrs. E. E. Pescott, F.L.S., and C. French, junr.—"The orchids of the Ringwood and Healesville Hills" (illustrated with lantern slides).

The committee will be pleased to receive promises of papers for future meetings.

7. Reading of Natural History Notes.
   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same, that he may arrange for their bringing them before the meeting; such notices should, however, be brief.
8. Exhibition of Specimens and Conversazione.
   Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Club year ended on 30th April last. Any subscriptions overdue should be forwarded to the Hon. Treasurer at once.

Subscriptions for the year 1924-5 became due on 1st May.

SPECIAL NOTICE.—The attention of members is directed to item 8 of business paper. Notices of exhibits should, if possible, be type-written.

EXHIBITION OF WILDFLOWERS.

The Annual Exhibition of Wild Flowers will be held on Tuesday, 29th September, 1925.

The Victorian Naturalist

Vol. XLI.—No. 10 FEBRUARY 5, 1925 No. 494

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 12th January, 1925.

The President, Mr. J. Searle, occupied the chair, and about fifty members and visitors were present.

CORRESPONDENCE.

From the Forests Department, stating that every care was being taken in planning the timber tramway at Myrtle Bower, Loch River, so that the natural beauty of the district would be interfered with as little as possible.

REPORTS.

A report of the visit to Beveridge Hill on Saturday, 13th December, was given by the leader, Mr. F. G. A. Barnard, who said that the attendance was rather small, probably owing to the extremely hot morning, but fortunately for those who went a cool change came up before they reached their destination. Beveridge Hill has been visited several times, and those who saw it for the first time on this excursion were greatly impressed with the sight of the well-preserved crater which it exhibits. According to the military survey of the district now in progress, the hill covers an area of 300 acres, or about three times as much as the University grounds. Its highest point is 1400 feet above sea level, or 400 feet above the plain on which it stands. The crater is about a quarter of a mile across and 250 feet deep. This season, on account of the numerous showers, it has contained a fair sheet of water. In addition to its geological and physiographical interest, the hill is notable as being the first vantage point visited by the explorers Hume and Hovell on the southern side of the Dividing Range on their memorable journey from New South Wales to Port Phillip in November and December, 1824, the following day to our excursion being the centenary of the explorers' visit. An attempt was made to photograph the crater, but without success. The party was indebted to Mrs. Smith, of the farmhouse at the foot of the hill, for hot water to make tea, and for permission to have their evening meal

on her lawn, after which the return was made to the train, and thence to town.

A brief report of the camp out at the National Park, Wilson's Promontory, on January 1-8 was, in the absence of the leader, Mr. C. Daley, F.L.S. (who was delayed by a heavy shower, and arrived later) given by Mr. T. James and Mr. L. Hodgson, who said that the party was favoured by splendid weather, and had a most enjoyable time.

ELECTION OF MEMBER.

On a ballot being taken, Dr. R. E. Shuter, Greendale, via Bacchus Marsh, was duly elected a country member, and Miss Margaret Jeffry, P.O., Molesworth, an associate member of the Club.

GENERAL BUSINESS.

Mr. A. Blake said that during a recent holiday in the Upper Goulburn district he had been surprised at the number of fixed lines being used in various parts of the river, more especially between Granite and Molesworth. He moved that the matter be brought under the notice of the Fisheries and Game Department, with a view to having the practice stopped. This was seconded by Mr. F. Pitcher, and carried unanimously.

PAPER READ.

By Mr. A. L. Scott, entitled "Some Victorian Holidays."

The author gave a number of reminiscences of holiday trips spent in different parts of Victoria when in search of natural history objects; these were illustrated by some excellent lantern views, comprising scenes along the Baw Baw track, at Lorne, the South-West Coast, Wandong, etc.

Messrs. Coghill, Barnard, Brown, Searle, and Williamson spoke of the interesting nature of the author's remarks, and the fine pictures exhibited. Mr. G. Coghill said that he was always on the look-out for new collecting districts for the Annual Wild-flower Exhibition, and asked Mr. Scott if he could give any information about the flowers he noticed in the Anglesea district, but the author said he had not sufficient botanical knowledge to give definite details.

Mr. C. French, junr., said that a list of the plants of the Anglesea district had been published some years ago by Mr. W. E. Adcock in the *Geelong Naturalist*, and probably further information could be found in that journal.

NATURAL HISTORY NOTES.

Mrs. E. Coleman said that several members had for the past three seasons been interested in a "greenhood" orchid which had been collected in certain localities, which suggested a hybrid between *Pterostylis falcata* and *P. nutans*. This has now been identified by Dr. Rogers, of Adelaide, as *P. acuminata*. Several of the flowers were exhibited at the recent Wild-flower Exhibition, together with specimens of *P. falcata* and *P. nutans*.

Miss J. W. Raff, M.Sc., F.E.S., read a note on the egg-laying of the Caper White Butterfly, *Belenois java teutonia*, which she had observed in the University grounds a few weeks before. The note was illustrated by a photograph of the egg clusters on the leaves of the food plant, a species of caper, probably *Capparis Mitchelli*, taken by Mr. A. O'Brien, University Agricultural School.

EXHIBITS.

By Mrs. E. Coleman.—Specimens of Imperial White Butterfly, *Delias harpalyce*, taken at Healesville, 11.1.25; colored drawings by Miss Dorothy Coleman of pupae of same butterfly obtained 26.8.24, and of imagoes which emerged on 15.9.24; flower spikes of orchids, *Microtis oblonga*, Rogers, *Cryptostylis longifolia*, R.Br., and *Spiranthes australis*, Lindl., collected at Healesville, 11.1.25.

By Mr. C. Daley, F.L.S.—Dried specimens of Saw Groundsel, *Senecio vagus;* Scented Groundsel, *S. odoratus;* Myrtle Beech, *Nothofagus Cunninghamii;* Tree Lomatia, *L. Fraseri;* Saw Banksia, *Banksia serrata;* Scented Fan-flower, *Scaevola suaveolens;* and Grass Trigger-plant, *Stylidium graminifolium* (very fine), collected during excursion to National Park, Wilson's Promontory; Aboriginal scrapers, etc., of flint and quartz, hammer-stone, and fragment of stone axe from kitchen middens at Wilson's Promontory.

By Mr. C. French, junior, Government Entomologist.—Small branch of Coast Tea-tree, *Leptospermum laevigatum*, F.v.M., with 87 larva-cases of Hubner's Case-Moth, *Thridopteryx hubneri* attached, from Carrum.

By Mr. L. Hodgson.— Specimens of the Pale-fruit Ballart, *Exocarpus stricta*, R.Br., with fruit attached; flowers of Saw Banksia, *B. serrata;* bark of Swamp Paper-bark, *Melaleuca ericifolia;* also shells collected at Sealers' Cove; egg-shaped pebble of water-worn granite from Wilson's Promontory excursion.

By Miss L. McMahon.—Marine shell, *Chione disjecta*, from Wilson's Promontory.

By Mr. V. Miller.—Shells collected at Sealers' Cove, Wilson's Promontory excursion.

By Mr. F. Pitcher.—Dried fronds of Soft Water-fern, *Blechnum* (*Lomaria*) *capense* L. over four feet in length, collected at Snobb's Creek, Alexandra, 3.1.25; blooms of Erect Clematis, *C. glycinoides*, grown on fence of garden at South Yarra; beetles, *Diaphonia* (*Schizorrhina*) *dorsalis*, found burrowing in large numbers in garden at South Yarra.

By Miss J. W. Raff, M.Sc., F.E.S.—Photograph of eggs of Caper White Butterfly, *Belenois java teutonia*, laid on leaves of Capparis sp. in University grounds, Parkville, December 15, 1924, in illustration of note.

By Mr. A. E. Rodda.—Wooden toys of native make, carved from Thornwood, from Bechuanaland Protectorate, South Africa.

By Mr. P. R. H. St. John.—Herbarium specimens of *Eucalyptus phellandra*, R. T. Baker, Mountain Peppermint Gum of New South Wales, collected at Mount Toole-be-wong, near Healesville, December 5, 1924, new record for Victoria; *Blechnum serrulatum*, Richards, Saw-leaf Gristle-fern, of New South Wales and Queensland, collected at Mount Toole-be-wong, December 1, 1924, also new for Victoria; *Eucalyptus amygdalina*, Labill. Black Peppermint Gum of Victoria and Tasmania, from Mount Toole-be-wong, December 4, 1924, not common in Victoria.

By Mr. H. B. Williamson, F.L.S.—Dried specimen of *Pultenaea D'Altonii*, H.B.W., collected by Dr. Sutton at Brisbane Ranges, October, 1924, previously known only from Nhill, North-West Victoria, collected there by Mr. St. Eloy D'Alton.

After the usual conversazione the meeting terminated.

A Notable Biography.—The recently-issued *Victorian Historical Magazine* for November, 1924, contains the concluding portion of a valuable paper by Mr. Chas. Daley, B.A., F.L.S., on the life of the late Baron Sir Ferdinand von Mueller, K.C.M.G., Government Botanist of Victoria. Nothing so complete in the way of the story of this great scientist's work has hitherto been published. In view of the interest of the subject, the author has arranged for its publication in pamphlet form. Copies will be available in a few days on application to the author (Clarinda Road, Caulfield) at one shilling each.

EXCURSION TO ALTONA.

Notwithstanding threatening weather, ten members took part in the excursion to Altona on Saturday afternoon, 15th November. The first place visited was the old Altona Bay Brown Coal Mine, now showing signs of the years of disuse in the dilapidated housings and rusting machinery. Climbing the mullock dump, access was gained to the landing brace, and from there an extensive view was obtained of the level basalt plains, with three shallow lakes on the north, west and south, in the middle distance. Further away to the south, the irregular outlines of the You Yangs breaks the skyline, while the sea fills the horizon on the east. A line of bores put down between Werribee and Yarraville some years ago disclosed an extensive bed of brown coal; that at Altona, after passing through 20 feet of basalt and about 300 feet of basalt limestone, clay and sand, being reached at 348 feet, and proved a thickness of 74 feet of brown coal. After collecting some specimens of silicified lignite from the old coal dump, a move was made towards the seashore. Some low-bracken-covered sand dunes yielded a few late spring wild-flowers and also some chips of Chert of aboriginal origin. Close to the beach was a dense growth of African Box-thorn, amongst which were many plants of the introduced Evening Primrose, displaying large lemon-yellow flowers. A cold, easterly wind had made the sea rough, and, the tide being full, the breaking waves were churning up the mud and decomposing sea-wrack which, in places, was piled up in thick masses on the beach. The atmosphere being somewhat tainted on this account, no time was lost in attaining a more salubrious neighbourhood, pausing only to examine some plants of the Horn Poppy and the Tamarisk trees that extend all along the foreshore. Beyond the jetty the sea was calmer and the beach cleaner. Several dead specimens of the Port Jackson Shark (Cestracion) were observed, and a freshly-caught one was closely examined to note the peculiar dentation and the two dorsal-fin spines. Bird life was not plentiful, probably on account of the cold wind, the English Skylark being most in evidence. Four Black Swans passed in flight almost overhead, and a few White-fronted Chats were seen. On the sands a couple of Dottrels foraged among the seaweed, and on a small island, formed of large boulders, half-a-dozen Black and Pied Cormorants were roosting.

Near the racecourse a small flock of waders of the Sandpiper family took rapid flight, and the sea marsh was full of starlings. Passing the marshy stretch, where Salicornia, Mesembryanthemum, and other saline plants were luxuriating, an attempt was made to reach the mouth of the Kororoit Creek, where some Mangrove trees still survive, but time would not permit and the party returned to Seaholm station. A. E. Rodda.

EXCURSION TO BLACK ROCK.

A party of about fifteen members assembled for the excursion to Black Rock on Saturday, 6th December, and were favoured by a fine day. A number of interesting plants were noted, and a profitable afternoon was spent. Above, on the cliffs, the Twiggy Aster, *Olearia ramulosa*, and the Grass Daisy, *Brachycome graminea*, were found in bloom, but no orchids. At the foot of the cliffs the Round-leaf Spear-grass in large, reddish tussocks, and the Coast Saltbush, *Atriplex cinereum*, with whitish foliage, contrasted with the darker green of the Sea Box, *Cynopogon* (*Alyxia*) *buxifolia*, the Coast Beard-heath, *Leucopogon* (*Styphelia*) *Richei*, and the Bower Spinach, *Tetragonia implexicoma*. Two interesting introduced plants, both with whitish foliage, were found at the foot of the cliffs, the Horn-poppy, remarkable for its long horn-like pods, and the Sand Lyme-grass, resembling a large form of Rye-grass. The fleshy foliage which characterises the sea-beach vegetation was exemplified by the Sea Celery, and plants of the Goose-foot family. The tide was very favourable for the investigation of shore life, being very low, and a large extent of Grass-wrack (Zostera) was uncovered. On this link, between the flowering plants and seaweeds, innumerable snails were noted, and several species of Chitons were collected by one of the party. Plants, often submerged by the salt water but now laid bare, were found flowering, such as the Trailing Joint-weed, *Hemichroa* (*Polycnemon*) *pentandra*; Common Sea-heath, *Frankenia pauciflora*; and Creeping Brook-weed, *Samolus repens*, all with white flowers.

I am indebted to Mr. A. E. Rodda for some further notes on the outing. He says:—"Advantage was taken of a very low tide to explore a number of exposed sandbanks and rocks. The rock formation here is highly ferruginous, and contains numerous limonitic concretions, in many strange

shapes, such as rods, tubes and spheres. Some very good examples of 'pot holes,' caused by the grinding action of loose stones in circular depressions, were noticed. Some of the rocks were almost covered by dense colonies of the tube-building worm (*Serpula*), and specimens of the tiny spiral form (*Spirorbis*) were found on fronds of seaweeds. The loose stones sheltered numerous small crabs, some of which carried masses of minute purple eggs held between the body and tail. Several specimens of a flat planarian worm, resembling pieces of animated kelp, were turned up, and also a few of the sea centipedes (*Nereis*)—an active worm beloved of anglers. In the sand pools, Sea Anemones, of a dull green or grey colour, with banded rays, were numerous, and a few of the black variety were seen. A capture that may prove to be a rarity, since it was new to all who saw it, was a small hairy, reddish-yellow crustacean, resembling a crayfish. Shellfish were in quantity but not quality, only common forms, such as limpets, whelks, zebra and top shells (generally known as periwinkles) were noted. A much greater variety of dead shells could be found amongst the drift material at high-tide mark. Chitons, or mail-fish, were found under stones or in sheltered crevices. Their overlapping valves resemble the joints in suits of armour. On the firm wet sand, strange-looking markings, suggestive of ancient inscriptions, excited our curiosity. These proved to be the tracks of a small white cockle, which ploughed a tiny furrow in the sand. Only one species of sea bird was noted, that being the Pacific gull, in both the mature and immature plumage."

The party returned to town well satisfied with the afternoon's outing.—H. B. Williamson.

A Key to the Eucalypts.—The Minister for Forests of Western Australia has, says the *Australian Forestry Journal* for November, approved of the issue of a key to the Eucalypts. This has been devised by Mr. S. L. Kessell, Conservator of Forests, in conjunction with Mr. C. A. Gardener. The key resembles the Dewey system of library cataloguing, numbers being used, each signifying a different characteristic, the combination of the different numbers indicating a certain species, thus 4268·1354 might stand, say, for *E. regnans*. The key has been devised for the species found in Western Australia; whether it would be applicable to all the species of the genus remains to be seen.

NOTES ON THE COLEOPTERA OF NORTH-WESTERN VICTORIA.

PART XII.

BY J. C. GOUDIE.

(Read before the Field Naturalists' Club of Victoria, 8th December, 1924.)

MORDELLIDÆ.

These singular beetles are easily recognised. They are mostly of small size, black, with white spots and markings; in shape, broadest in front, tapering behind, the tip of the body being produced to a sharp spine. They frequent the blossoms of trees and shrubs, often in large numbers.

4317. *Mordella communis*, Wath.

4324. *M. leucosticta*, Germ.

CANTHARIDÆ.

This family includes slender, graceful beetles, with fairly long antennæ and legs. The head is narrowed behind, forming a distinct neck. They are not often seen in the Mallee country; specimens have been taken flying slowly near the ground, or resting on leaves or grass-stalks.

4357. *Palæstra rubripennis*, Cast. Black, with dark-red, strongly-ribbed elytra. It is nearly three-quarters of an inch long.

4377. *Zonitis lutea*, Macl. Antennæ and legs black; head, prothorax and elytra yellow; half an inch in length. *Z. mystica*, Blackb. Head, antennæ, tarsi and tibiæ black; prothorax and femora (except the tips of latter) yellow; elytra, blue.

4391. *Z. splendida*, Fairm. A fine species. An example taken on the wing near Birchip is half an inch in length. It is much broader than the other local species, the elytra being widest near the apex; black, except elytra, which are metallic green on basal half, purple on remainder.

ŒDEMERIDÆ.

These are long, slender beetles, with soft elytra, having a slight resemblance to some Longicorns met with on flowers and foliage.

4402. *Oxacis (Ananca) australis*, Boisd.
O. picticeps, Lea, Tr. Roy. Soc. S.A., XLI., p. 313.

4407. *Copidita (Ananca) puncta*, W. S. Macl.

CURCULIONIDÆ.

Although much varied in form and size, the beetles of this family are very easily recognised, the well-developed rostrum, on the sides of which are placed the angulated or "elbowed" antennæ, and four-jointed tarsi, being unmistakable characters. It is one of the largest groups of beetles in Australia, over 1200 species appearing in Master's Catalogue, and a great many have since been described by Messrs. Blackburn, Ferguson, Lea and Sloane. Owing to the dull colours and general absence of distinctive markings of the local species, I have refrained from attempting to "describe" them, excepting a few of the more conspicuous. None the less, they are a very interesting group, and some of them remind us of their existence in no uncertain manner, the Apple-root Borer, *Leptops squalidus* (=hopei), and the Grain Weevil, *Calandra granaria*, being familiar examples.

As to their habits, they are all vegetarians, the arboreal species eating the tender bark of the twigs and epidermis of the leaves of their host-plant, while the terrestrial species subsist on grasses, etc.

4423. *Prosayleus comosus*, Germ.
4424. *P. dispar*, Germ.
Titinia bicolor, Blackb.
T. eremita, Blackb.
4464. *T. ignaria*, Pasc.
4551. *Polyphrades longipennis*, Pasc.
Essolithna vittaticeps, Blackb.
4622. *Leptops tribulus*, Fabr.
4596. *L. squalidus*, Boh. =hopei, Fahrs.
4639. *Zephryne (Hyphœria) assimilis*, Pasc.
Z. geometrica, Lea.
4640. *Ethemaia adusta*, Pasc.
4643. *E. sellata*, Pasc.

Sub-Family AMYCTERIDES.

This is a well-defined group of weevils, characterised by the short, broad rostrum, apterous body, very hard elytra "soldered" together, and the funicle of antennæ six-jointed. Dr. E. W. Ferguson, in his admirable *"Revision of the Amycterides," says that: "All the Amycterides are ground-dwellers, being found under logs and stones, while one or two may be obtained from the roots of grass-trees (*Xanthorrhœa*). They are essentially dry-country insects,

*Proc. Linn. Soc. N.S.W., 1915.

and seem capable of storing up the vegetable material on which they live in their abdominal cavities for long periods.

"In regard to their life-history, we are no further advanced than in Sir William Macleay's day, and nothing is known of the larval or pupal forms of these insects." For the subjoined note on the Mallee species, I am indebted to Dr. Ferguson, whose valuable memoirs have greatly enriched our knowledge of these singular beetles.

"The Amycterid fauna of the Birchip and Sea Lake district is an interesting one. As might be expected from its geographical position, all the species found or so far recorded from the district—are also inhabitants of South Australia. From this, it follows that the genus Sclerorinus is the one most represented by number of species, there being six representatives of that genus. The district fauna is further of interest in relation to the fauna of the more southerly portions of Victoria, comprised within the Bassian sub-region of Spencer. If we take the genus Sclerorinus we find that it is represented chiefly by species of the tristis type, which are members of the first section of the genus, according to my classification, the exception being *S. sublineatus*, Germar, of which I have a specimen labelled Melbourne. This first section is not represented at all in the Mallee districts, though it is the typical section of the genus, abundantly in South Australia, and apparently of Eyrean origin. From these considerations, it seems that the parts of Victoria comprised within the Bassian sub-region have been populated from the coastal and mountainous regions of South Australia, and not from the more northerly portions of Victoria, belonging to the Eyrean sub-region."

Psalidura flavosetosa, Ferg. Proc. L.S., N.S.W., 1915. p. 561.

This is the largest of the Mallee ground weevils, measuring over an inch in length. The males of this genus have strong anal forceps.

4738. *Talaurinus riverinæ*, Macl.

4753. *T. squamosus*, Macl. A Murray River species.
Sclerorhinus dixoni, Ferg. Proc. Roy. Soc. Vic., 27, p. 253.

4786. *S. germari*, Macl.
S. goudiei, Ferg. L.C., P. 254.

4803. *S. riverinæ*, Macl. = *alternus*, Macl.

4811. *S. sublineatus*, Germ. = *marginatus*, Pasc.

4817. *S. vestitus*, Macl. = *mucronatus*, Macl.

4834. *Acantholophus crenaticollis*, Macl.
4852. *A. planicollis*, Waterh.
4875. *Cubicorrhynchus maculatus*, Macl.
C. taurus, Blackb.
Mythites, sp. Portions of a beetle, evidently belonging to this genus were found at Sea Lake.
4918. *Amorphorrhinus australis*, Germ.

I have found this species at only one locality, viz., near the southern end of Green Lake.

Ophryota nodosa, Blackb.

Though not an Amycterid, this species is taken on the ground, usually under the shelter of a salsolaceous plant known as "Saltweed."

4982. *Oxyops fasciata*, Boisd.
4985. *O. gemella*, Pasc.
4987. *O. irrasa*, Pasc.
O. obscura, Blackb.
O. scoparia, Lea.
O. serricollis, Lea.

The species of Oxyops are convex, rather thick-set, beetles, under half an inch long; fairly common, and taken on Mallee shoots.

Pantoreites major, Lea.
4972. *P. (Oxyops) arctatus*, Pasc.
Syarbis brevicornis, Lea.
S. goudici, Lea.

These are met with in the porcupine grass country, on the Broom Ti-tree. *P. major* is greyish-brown, with a white vitta on head and prothorax. The elytra have the suture and two lateral vittæ white; it is one-third of an inch in length.

The species of Syarbis are much smaller, very convex, and although the tarsi are not armed with claws, the beetles are able to cling very tightly to the twigs so much so that shaking will scarcely dislodge them.

5017. *Bryachus squamicollis*, Pasc.
5040. *Strongylorhinus ochraceus*, Schon.
5067. *Pelorrhinus sparsus*, Germ.
Rhinaria tibialis, Blackb.
5092. *Lixus mastersi*, Pasc.
Orthorrhinus cylindrirostris, Fabr.

Two specimens of *O. cylindrirostris*, taken on "lignum," are very much smaller and paler than southern examples.

Desiantha major, Blackb.

D. parva, Blackb.

D. sericea, Blackb.

These are taken on the ground, under logs, etc., in swampy localities.

Diethusa (Lybæba) famelica, Lea.

D. pretiosa, Lea.

D. squamivaria, Lea.

D. trifasciata, Lea.

The species of Diethusa are pretty little red and yellow mottled or fasciated weevils, found usually on wattles.

Misophrice, sp. A minute, green-scaled weevil, taken on Casuarina leaves.

Bagous australasiæ, Blackb.

Eristus setosus, Blackb.

Symbothinus squalidus, Blackb.

Antyllis alternatus, Blackb.

Epamœbus ziczac, Lea.

Cyttalia erichsoni, Pasc. A blossom-frequenting species.

5225. *Belus bidentatus*, Don.
5234. *B. filiformis*, Germ.
5253. *B. suturalis*, Boisd.

The species of Belus are long and slender, with thickened front femora, and the elytra produced into a point at the tips. The elytra are usually reddish-brown—in some species spotted or mottled; the ventral surface of body often clothed with white scales. They feed on the bark of various Acacias.

5263. *Isacantha dermestirentris*, Boisd.
5265. *Rhinotia hæmoptera*, Kirby.

These somewhat resemble Belus, but the elytra are not pointed behind. *R. hæmoptera* breeds in the mistletoe, *Loranthus pendulus*. It is five-eighths of an inch long, and is red, with two black vittæ on the prothorax; in some specimens the margin only of prothorax is red.

5302. *Aulctes suturalis*, Waterh.
5323. *Læmosaccus electilis*, Pasc.
5330. *L. narinus*, Pasc.
5334. *L. querulus*, Pasc.
5336. *L. subsignatus*, Boh.
L. variabilis, Lea.

The species of Læmosaccus are found mostly on acacias or eucalypts, with the exception of *L. electilis*, which feeds on the Cabbage-bush, *Heterodendron olæfolium*. It is black, with much white about the under-surface, and is about a quarter of an inch long.

5347. *Zeophus storeoides*, Pasc. A small brown curculio, with a long, curved proboscis.
5351. *Haplonyx centralis*, Pasc.
5352. *H. cionoides*, Pasc.
5355. *H. fasciculatus*, Boh.
H. mæstus, Lea.
H. orbiculatus, Lea.
H. serricollis, Lea.
5380. *H. spencei*, Gyll.
H. uniformis, Lea.

The Haplonycides are small, very convex, "dumpy" weevils, found generally on eucalyptus foliage.

Melanterius amplipennis, Lea.
M. cardiopterus, Lea.
5402. *M. vinosus*, Pasc.

The last-named species seems to prefer the umbrella acacia, *A. oswaldi*, as a food-plant. It is dark purplish-red, the elytra strongly punctate, and mottled with yellow, and is about a quarter of an inch in length.

5538. *Metyrus (Cryptorrhynchus) albicollis*, Germ.

This is considered rather a prize by beetle-collectors. It is three-eighths of an inch long. The elytra black, slightly tuberculate. The prothorax, with the exception of a small space in the middle of base, is thickly clothed with white scales, and parts of ventral surface and femora are similarly clothed. It breeds in the stem and larger branches of the Drooping Mistletoe, *Loranthus pendulus*.

Eleagna nodipennis, Lea.
5508. *Chatectetorus clittellæ*, Pasc.
5516. *Achopera lachrymosa*, Pasc.
Calandra granaria, Linn (introduced).
5601. *C. oriza*, Linn. (introduced).
Homotrachelus australasiæ, Faust.
Thechia papuana, Pasc.
Geosomus macleayi, Faust.

In addition to the above, there are about a dozen unidentified species belonging to various genera, making a total of over 100 species of Curculionidæ.

BUSH PLANTS IN A CITY GARDEN.

The first to respond to the call of spring was the pretty Fringed Heath-Myrtle, *Micromyrtus ciliatus*, which, after sending out its graceful, green, tasselled spikes, bedecked each stalk with its small reddish flowerbuds, which later burgeoned out into clusters of dainty white flowers, tinged with red like the blush on a maiden's cheek. This Micromyrtus from Hall's Gap has bloomed for three years.

The Bushy Heath-Myrtle, *Thryptomene Mitchelliana*, its near relative, now in its third year of vigorous growth, was also putting out its light green foliage, and then more slowly burst into bloom, until, under the genial influence of moisture and sunlight, it became a beautiful shrub, with a profusion of fairy-like white flowers. This year, in our Melbourne streets and suburbs, these graceful sprays have captured the fancy of flower-lovers.

Then the Grampians Fringe-Myrtle, *Calytrix Sullivani*, a beautiful plant, five feet in height, with darker green foliage, also projecting in growth lighter green segments, each laden with closely-packed buds of promise, bloomed coyly at first in its white fringed flowerets, until the rough wooing of a blustering north wind brought in response a quickening of bloom, so that it is now a sight delightful to the eye. This Calytrix is from Stony Creek.

Two years ago I brought, casually, a young plant from the Whipstick Scrub, which had grown well during the last year without blooming. A fortnight ago, it broke into bursting bud, and its delicate pink flowers showed it to be an old friend, the Common Fringe-Myrtle, *Calytrix tetragona*, now a mass of graceful flowering sprays. When the petals fall, the darker calices of the fading blooms, still with their reddish tinge, render its appearance attractive, as in a lesser degree also that of Calytrix Sullivani whilst Myeromyrtus and Thryptomene take on also a brownish tinge as the petals fall from the florets.

Grevillea linearis, a graceful shrub, is covered with its attractive flowers, and will bloom for several months. Just under its shade is a soft-leaved Pultenæa, which has not yet flowered. The Large-leaf Pultenæa, *P. daphnoides*, after blooming freely for two years, died last season. A small plant of Common Heath, *Epacris impressa*, in company with an unrecognised friend, put out a few white flowers. The Long-leaf Waxflower, *Eriostemon myoporoides*, with its urn-like buds, and starry white flowers, makes a pleasant show. Above it grows vigorously a Brachysema, with deep red

pea-flowers, and nearby a little Lemon Crowea, *Asterolasia Muelleri*, transplanted six months ago, from a cool dell in the Plenty Ranges, is showing its yellow blooms for the first time, whilst a fragrant Boronia, by its perfume, invites attention.

Under a sheltering Musk-tree, or Daisy Bush, *Olearia argophylla*, ten feet in height, grow ferns from distant gullies: a young Mountain Pepper, from Warburton; a Gleichenia, or coral fern, from Wallaby Creek; a Creeping Polypody, *Cyclophorus serpens*, from the Cann River; a struggling Golden Shaggy Pea, *Oxylobium elliptcum*, from near Black Sands Creek. Each bush plant has its own interest, derived from place, incident, or circumstance, e.g., the Musk Daisy-bush, now a sheltering tree, was really a foundling—an uninvited guest. Its foster-mother was a fern brought from a Lorne fern gully. The fern died, and from its remains, Phœnix-like, sprang up the Musk-tree, a monument to its foster-mother.

On the lawn, a Lilly-pilly, *Eugenia Smithii*, gives promise of healthy growth, whilst three Snowy Mint-bushes, *Prostanthera nivea*, from the You Yangs, are sprouting fresh foliage, preparatory to blooming in creamy flowers a little later on in the season.

Many of our native plants respond to culture and attention, and an inspection of the Australian section of plants in the Botanical Gradens reveals the variety and the beauty of bush plants that might gladden our home gardens.—C.D.

The Caper White Butterfly.—During the flight of the Caper White Butterfly, *Belenois java teutonia*, around Melbourne last December (1924) I was fortunate in having the opportunity of observing the process of egg-laying by this butterfly on *Capparis spp.* in the University grounds. The elongate fluted eggs when first laid were of a translucent pale-green colour, but later turned orange-yellow. The young twigs and both the upper and lower surfaces of the softer leaves were chosen for egg placing, and the regularity with which the eggs were laid was remarkable. The act of laying each egg took, on an average, four seconds, and the interval of rest between each oviposition was twelve seconds. One of the leaves in the photograph exhibited to-night carries 150 eggs, which, judging by the uniformity of the series, I should say were laid by a single female; another leaf shows 125 eggs in similar uniformity, but time did not permit of determining the

maximum number laid by any one female. One butterfly captured on the wing was placed in captivity, and laid 85 eggs, but this probably would not represent the maximum number. In referring to literature on the subject, I find the following:—Anderson and Spry in *Victorian Butterflies* write: "The eggs are deposited upright in patches of 50 or 60 upon the upper surface of the leaf:" Frogatt, in the *Agricultural Gazette of New South Wales* for 1899, describes them in clusters of from 20 to 40; while Rainbow, in *Australian Butterflies*, says: "There may be a dozen upon a single leaf." The larger numbers of eggs on a single leaf, as observed by me, may be a matter of interest to some. Hatching was observed later, and the mass of little orange-yellow larvae soon demolished the thin pale-greenish egg-shells from which they had hatched. The head of the larva, which is black, was noted to be situated at the apex of the egg, i.e., at the upper end. The adults were very active on the wing, and were apparently feeding on lucerne and other plants. The species of Capparis cannot be determined with accuracy until the flowering season, but one of them has been indentified at the National Herbarium as probably *Capparis Mitchelli*. The trees were planted many years ago by Professor McCoy. Towards the end of the year 1921 larvae and pupae were collected by me from these plants.—Janet W. Raff, M.Sc., F.E.S., January 12, 1924.

Why Birds Become Extinct.—That many more birds will vanish from the face of the earth as time goes on seems inevitable. In the *Australian Museum Magazine* for October, Mr. Tom Iredale tells the tales of the tragedies which have occurred around Australia. The first visitors to Norfolk Island and Lord Howe Island, those two lovely spots in the ocean a few days sail east of Sydney, once possessed a wealth of bird-life of various kinds, but as Mr. Iredale remarks, the birds were "good to eat," hence their disappearance. The same diminution of bird-life is going on in New Zealand, though there it is attributed more to the introduction of foreign birds and mammals. Australia has, so far, only a small list of extinct birds, but no doubt others will follow the fate of the Kangaroo Island Emu, and its relatives in King Island and Tasmania. Of these, only a few skins and skeletons are known to exist, accompanied by drawings made during the early voyages of discovery. Let us be up and doing, and see that our Lyre-bird does not follow.

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The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria

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Hon. Editor: F. G. A. BARNARD, Esq.

The Author of each article is responsible for the facts and opinions recorded.

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1925.

Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING.

MONDAY EVENING, 9th MARCH, 1925.

1. Correspondence and Reports.
2. Election of Members.
3. Nominations for Membership.
4. General Business.
5. Remarks by Exhibitors relative to their Specimens.
   Ten minutes' adjournment for discussion of Exhibits.
6. Reading of Paper and Discussion thereon.
   1. By Mr. C. Oke—"New Australian Coleoptera."
   2. By Mr. C. D'Alton—"Plants and Shrubs Peculiar to the Grampians."

   The committee will be pleased to receive promises of papers for future meetings.
7. Reading of Natural History Notes.
   Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same, that he may arrange for their bringing them before the meeting; such notices should, however, be brief.
8. Exhibition of Specimens and Conversazione.
   Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Club year ended on 30th April last. Any subscriptions overdue should be forwarded to the Hon. Treasurer at once.

Subscriptions for the year 1924-5 became due on 1st May.

SPECIAL NOTICE.—The attention of members is directed to item 8 of business paper. Notices of exhibits should, if possible, be type-written.

NOTICE.

Alteration of Rules.

A Special Meeting of the Members of the Club will be held on Monday evening, 9th March, at **7.45 p.m.**, to consider alterations to Rule 4—Subscription: "That word 'fifteen' in clause b of Rule 4 be altered to read 'twenty,' " and, if this be agreed to, consequent alterations be made to rates of subscription for country members and associates.

The Victorian Naturalist

Vol. XLI—No. 11. MARCH 5, 1925. No. 495.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Horticultural Society's Hall on Monday, 9th February, 1925.

The President, Mr. J. Searle, occupied the chair, and about fifty members and visitors were present.

CORRESPONDENCE.

From the Victorian Bush Nursing Association thanking the Club for its donation of £55 to the funds of the Association, being half of the proceeds of the Wild Flower Exhibition held in October last, and inviting the Club to nominate two members for the life membership of the Association.

The Hon. Secretary announced that the Committee had nominated Miss Amy Fuller and Mrs. E. Coleman for life membership of the Association, and that the nominations had been accepted. Miss Fuller wrote returning thanks for the honor done her.

REPORTS.

A report of the excursion to Queen's Park, Moonee Ponds, for pond-life, on Saturday, 17th January, was given by the leader, Mr. J. Stickland, who reported an interesting afternoon. A large number of forms had been obtained, though none were of particular rarity.

A report of the excursion to the Oakleigh Golf Links on Saturday, 31st January, was given by the leader, Mr. H. B. Williamson, F.L.S., who said that a fair number of members had spent a very pleasant afternoon in inspecting the great variety of Australian trees and shrubs which had been planted about the Club's property.

On the motion of Messrs. C. Daley, F.L.S., and F. Pitcher, it was decided to send to the Golf Club, through Mr. C. C. Plante, a letter of appreciation of its efforts to foster the growing of Australian vegetation for decorative purposes.

A report of the excursion to Ferntree Gully on Saturday, 7th February, was given by the leader, Mr. C. Oke, who stated that only a few members made the trip, and that the results in the way of entomology were not very important.

ELECTION OF MEMBERS.

On a ballot being taken, Miss A. Robertson, Presbyterian Ladies' College, East Melbourne; Mr. Harold R. Clark, 27 Moorehouse Street, East Camberwell; and Mr. J. de L. Forth, 476 Collins Street, Melbourne, were duly elected members of the Club.

GENERAL BUSINESS.

The President, on behalf of the Club, wished Mrs. Thompson *bon voyage* on her projected trip to England, where she intended to spend about twelve months; and expressed the pleasure of the members at the presence of Mr. A. E. Keep on his return to Melbourne after his European holiday.

The President offered the Club's congratulations (*in absentia*) to Mr. G. A. Waterhouse, B.E., F.L.S., on his obtaining the degree of Doctor of Science.

Mr. G. Coghill called attention to the unsatisfactory state of the finances of the Club, and said that the subscription of 15/- per annum, which was sufficient years ago, was now too small to maintain the Club in an efficient state, and gave notice that he would move at a special meeting of the Club, to be called for the purpose, that the annual subscription be raised to 20/-.

Some little discussion ensued, and it was generally agreed that some such step was desirable.

Mr. E. E. Pescott, F.L.S., referred to Mr. Daley's recent contribution to the literature relating to the late Baron von Mueller, K.C.M.G., for many years Government Botanist of Victoria, and one of the leading botanists of the world, the centenary of whose birth would occur on 10th June next. He considered that the Club, which, in its early days had been greatly helped by the late Baron, should in some way celebrate the centenary, and asked the Committee to consider the suggestion.

The chairman replied that the matter had been mentioned at the last meeting of the Committee, but a definite scheme had not yet been drafted.

A vote of thanks was carried to the Victorian Horticultural Society for having allowed the Club the use of its hall during the carrying out of renovations at the Royal Society's rooms.

PAPER READ.

By Messrs. E. E. Pescott, F.L.S., and C. French, junr., entitled "The Orchids of the Ringwood and Healesville Hills."

In view of the fact that owing to the spread of habitations, cultivation, or grazing, localities once abounding in orchids and other wild-flowers can no longer be regarded as good collecting grounds, the authors submitted their paper as one of a short series detailing experiences of thirty years orchid collecting around the metropolis. In this the hilly country around Box Hill, Ringwood, Lilydale, and thence to the Dandenongs and Healesville, was dealt with. The paper was well illustrated with lantern slides of many of the species mentioned, and was accompanied by a list of species and localities for publication and record.

Messrs. Williamson, Barnard, Coghill and Searle, spoke to the paper.

EXHIBITS.

By Mr. A. S. Blake.—Flowering branch of the Western Australian gum, *Eucalyptus macrocarpa*, grown at Ivanhoe.

[These were exceptionally fine, measuring nearly two and a half inches across. Ed. *Vic. Nat.*]

By Mr. F. Cudmore.—Large fossil shell, *Voluta Mortoni* Tate, from the tertiary (Balcombian) of Grice's Creek, Frankston; recorded in Dennant's and Kitson's list, only from Muddy Creek, Hamilton, Vic. (Balcombian), and from Table Cape, Tasmania (Janjukian).

By Miss C. C. Currie.—Flowers of orchids, *Cryptostylis leptochila*, Small Tongue-orchid, and *Spiranthes australis*, Austral Lady's Tresses; Larva of Cole's Gum Moth, *Chelypteryx Colesi;* and piece of Messmate timber containing larva of a longicorn beetle, all from Lardner, Gippsland.

By Mr. C. French.—Nine coloured drawings of Grampians orchids by Mr. W. Foster.

By Mr. L. Hodgson.—Twenty-one photographs taken during the excursion to National Park, Wilson's Promontory.

By Mr. J. Leslie.—Dried specimens from Tasmania illustrating gradation of *Eucalyptus Risdoni* from *E. amygdalina;* three Victorian specimens showing variability in *Eucalyptus amygdalina*, Lab.

By Mr. E. E. Pescott, F.L.S.—Flowers of the Queensland terrestrial orchid, *Calanthe veratrifolia*, R. Br., from pot-grown specimen grown at Camberwell.

By Mr. A. E. Rodda.—Carapace of Box Tortoise, from South Africa.

By Mr. J. Wilcox.—Flowers of New South Wales Christmas-bush, *Ceratophyllum gummiferum*, grown at Camberwell.

The following exhibits should have been included in the January list on page 188:—By Mr. J. Leslie.—Dried plant specimens collected on National Park excursion, including White Kunzea, *K. corifolia*, Reichb. (new divisional record); Austral Trefoil, *Lotus australis;* Paper-flower, *Thomasia petalocalyx*; Fieldia, *Fieldia australis;* and Forest Speedwell, *Senecio odoratus*.

Seasonal Records.—The "Nature Notes" column in the *Argus* often contains notes which are helpful to the student of bird or insect life. For instance, on several occasions lately the Orchid Papilio butterfly has been mentioned from various parts of the State; without such records this butterfly would have been regarded as very rare in Victoria, but so many notices appear to indicate that with the increase of citrus cultivation, this fine butterfly is likely to be more seen.

EXCURSION TO THE NATIONAL PARK.

The fifth Club excursion to the National Park, Wilson's Promontory, took place during the first week of the New Year. The party consisted of Mr. and Mrs. L. Hodgson, Mr. and Mrs. V. Miller, Miss L. McMahon, and Messrs. K. Hatfield, T. J. James, J. R. Leslie, C. Ralph, and C. Daley (leader), six of whom were members of the party for the 1923 excursion. It was greatly regretted that, owing to illness, Mr. J. A. Kershaw, secretary to the Park Committee, was unable to go as leader, but, notwithstanding the mutual disappointment thereat, Mr. Kershaw had made suitable preliminary arrangements for the visit, the offer of a Foster Motor Co. to take the party by motor-waggon from Foster to the Darby River being accepted.

However, on a trial trip about ten days before New Year's Day, the motor-waggon got into unstable sand almost within sight of its destination, was overwhelmed by the incoming tide, and definitely put out of action. The company then arranged to take the party through in a capacious cream waggon. Finally, two days before departure, a telegram arrived from the Chalet directing us to disentrain at Fish Creek. On arrival there we found that two waggonettes were to convey us via Shallow Inlet and the beach route.

Leaving town by the early train on New Year's morning, we arrived at Fish Creek (99 miles) soon after noon. After a somewhat hasty dinner, tidal conditions necessitating speed, we set off for Fishermen's Camp, about 12 miles distant. The road leads through the hills west of the Hoddle Range, the hills as usual being almost bereft of their natural forest protection, presenting, in some cases, a picture of blank desolation. Not far out, in a Blue-gum by the roadside, we saw a Koala with her young one in close embrace, unconcernedly viewing our passage. After leaving the hills behind, the Waratah Bay road passed south-west over windswept heathy country, the vegetaton being low and scrubby. A dwarf Eucalypt met with proved to be *E. Kitsoniana*. The Common Heath, *Epacris impressa*, the Scented Paperbark, *Melaleuca squarrosa*, the Coast Tea-tree, *Leptospermum laevigatum*, the Small Grass-tree, *Xanthorrhoea minor*, the Long Purple-Flag, *Patersonia longiscapa*, were observed in flower; and generally, the dwarfish flora was that of a sandy and exposed coastal moor. In the moister places there were patches of twisted Eucalypts, Acacias, Casuarinas, and Banksias of medium height. No doubt, in springtime, there would be a great profusion of flowers on this heathy country. Approaching the coast, a divergence was made from the Waratah Road. Along the creek the vegetation grew more thickly and the timber more robust in habit, the Coast Banksia, *B. integrifolia*, growing well.

At Fishermen's Camp were six saddle-horses, which had been ridden from the Promontory by returning visitors of the Walkers' Club, so six of us mounted, the remaining four proceeding with the luggage in the two vehicles. Fish Creek here embouches to the sea. Although we had come at a good pace from our starting point, the tide was setting in, and it would take all our time to reach the Darby, via the beach. Shallow Inlet is fitly named, and a favourite fishing ground. For the most part the shallows are increasing, the sea-front being partly reclaimed, as sand-stay vegetation, even if a tuft of grass, gets a footing, and assists as a slight barrier against the tidal action, thus helping to encroach upon the sea. In other places the sea is wearing away the shore, as is evident by the number of up-rooted Banksias washed out from their hold on the coastal hummocks. Thus the age-long processes of wearing down and building up are continuously in operation. In many places along this coast is a black, peaty deposit of uncertain age and varying depth, probably

the bottom of ancient morasses or swamps of considerable extent—a further indication of encroachment by the ocean on the uncertain land surface of this coast.

Another feature is the very great extent of wind-blown sand hummocks stretching inland, amid which is a succession of "kitchen middens," the coastal vicinity being formerly a source of abundant food supply to the aborigines. Here and there in the shallows are extensive deposits of shells washed in by the tides. At some parts of Shallow Inlet the ocean must, at low tide, be distant about a mile from its position at high tide. Here was seen a large dead seal, which had been stranded high and dry on the shore.

Our race against the tide was lost, for before we could reach the cliffs, north of the Darby River, the waves were at their base, so that we had to turn into the scrub between some sand hills, and, by a lengthened route, make our way to the entrance-gate of the Park, and thence by the road to the Chalet over the Darby Bridge. Passing over the open downs within the enclosure, we saw two flocks of Emus grazing, about a dozen birds in all, some of large size. This part of the Park is their favorite haunt. Approaching the Darby Bridge, we passed the camp of the walkers and tourists, eighteen of whom had gone to the Promontory on Xmas Day by the coast in the cream waggon, provided in lieu of the motor-waggon, which they had assisted in salvaging *en route*. We arrived about 6.30 p.m., and found the Chalet full, the single members of our party having to sleep in the Rest House near the Bridge, as on the previous excursion. Details in regard to the Promontory have been given in the report of the 1923 visit (Vic. Nat., March, 1924, vol. XL, p. 212), and much information in regard to previous excursions is available in previous volumes of the *Naturalist*.

We were not able to break any new ground, but had daily excursions to some of the sandy bays, buttressed headlands, open moors, or timbered slopes. An enjoyable and interesting trip was made to Lilly-pilly Gully, with its shady groves and clear sparkling streams, in which the mountain trout disported themselves. Lilly-pillies, *Eugenia Smithii*, are exceedingly numerous, from seedlings a few inches high up to veterans of great age and size, with trunks beset with mosses and polypodies. The chief excursion undertaken was to Sealers' Cove, a distance of about twelve miles; again a most delightful experience, not only for the

variety in types of country passed over, but also for the luxuriance and attractiveness of the flora on the eastern slope of the Park. After passing through the dense Hazel, *Pomaderris apetala*, thickets on the saddle between the Wilson Range and Mount Ramsay, we found the track, although noticeably drier than the year before, in very good order, the encroaching Sword-grass being kept well in hand and the obstructions removed. The slopes of the ranges, which form an amphitheatre enclosing and sheltering the Cove, are densely clothed with vegetation, Pteridophyta being specially noticeable, nearly every fern in the census being well represented; Mosses also were very numerous. Amid the characteristic fern-gully vegetation were some handsome trees of the Myrtle-Beech, *Nothofagus Cunninghamii*.

One is puzzled at the abundance of dead tree-trunks of great height which occur in this area. Were they killed by fire as the ranger opines, or have they, after unusually rapid or abnormal growth to maturity, died slowly from the top, having exhausted both their available nourishment and their vitality? Support is given to the latter theory from the fact that where any fairly high-living gum-trees still remain, the top branches are dead. The scores of huge tree-trunks which lie uprooted also show, on examination, a shallow and seemingly inefficient root system in proportion to the extreme height and bulk of the trees. Granite ranges do not give the security for firm rooting which is so necessary for very lofty trees, growing on such steep slopes; hence the tendency to crash downwards, which is a feature of this area. We camped for the night at the Cove. The beach is a good one for shells of many species. Sealers' Creek has a considerable volume of water, its basin being extensive and the watershed high. It rises near Mount Latrobe, 2434 feet, with an affluent from Mount Wilson, 2350 feet, thus draining an area of about ten square miles, having a good rainfall. Mountain trout and blackfish are in this stream, and with tidal interchange salt-water fish will be found near its mouth. Directly east of the Cove, on the horizon, lie four islands, one of which, Cliffy Island, has a lighthouse. We also saw a red light to the south-east of the Cove, but were unable to determine its cause. After a short though pleasant sojourn at this attractive haven, we left next day, and returned in good time to the Chalet.

The weather had been delightful, but on Wednesday a misty rain fell, and the projected excursion to Norman Bay, into which Tidal River flows, was abandoned for two shorter

excursions closer at hand. On one of these we went south along the summit of the ranges, west of the Darby saddle, through the fine Casuarina groves, and amid huge granite boulders. Fine views of the Inlet, and of the picturesque western coast and islands are here obtained. We then took a cut through thick scrub to the little bay on the northern side of the track to Tongue Point. The tide being fully out, opportunity was taken to examine with interest the abundant shore-life left in the deeper holes among the granite outliers.

On Thursday morning, 8th January, with an outgoing tide, after an early start, a safe return to Fish Creek was made. The great extent of sand surface at Shallow Inlet, left by the receding tide, was now very evident. Four of the party, however, stayed until Friday in order to make an excursion on horseback to Oberon Bay. It was rather disappointing to see so little wild-life in the National Park. No kangaroos were visible. The Koalas seem to be fairly numerous, about a dozen in all, including two babies in arms being observed. An Echidna was seen by one of the party. Black-backed Wallabies occasionally bounded into and out of view. A few rabbits and a fox showed as unwelcome intruders. Two or three snakes, copperheads and one brown snake, were reported, whilst small lizards were numerous. Bird life was well represented. Flocks of vociferous White and of Black Cockatoos were frequently seen and heard, whilst Wattle-birds, Derwent-jackasses, Lories, and Pennant-parrots haunted the Banksias and coastal scrub. At early morn near the Rest House the tuneful and varied notes of many birds were heard from daybreak onwards—a pleasing relief from the raucous cries of city milkmen at dawn. A Derwent-jackass and a Whip-bird, respectively, gave daily exhibitions of their vocal powers, near the Rest House, both at the opening and close of day.

Evidently the flowering season was about a month earlier at the Park this year compared with last, for many plants in bloom last year at this time had passed that stage. About eighty species were noticed in flower, as against one hundred and four last year. The introduced Purple Senecio, *S. elegans*, with single and also double flowers on the same stems, was one of the first to attract the eye; White Kunzea, *K. corifolia*, and the Coast Tea-tree, *Leptospermum laevigatum*, were in full bloom. Austral Trefoil, *Lotus australis*, and Purple Swainson Pea, *S. lessertifolia*, were conspicuous in flower and pods. Myrtle Acacia, *A. myrtifolia*, scantily

PLATE VI.

CUSHION-BUSH, *Calocephalus Brownii*
With C. Daley, F.L.S., leader.

bloomed, and the Coast Acacia, *A. sophorae*, and the Spike Acacia, *A. oxycedrus*, were in the fruiting stage. Sweet Bursaria, *B. spinosa*, and the pretty Paper-flower, *Thomasia petalocalyx*, the latter, abundant on the Tongue-Point track, were flowering well. Olearias were mostly in seed; a few Composites in bloom. The Pale-fruit Ballart, *Exocarpus stricta*, with its berry-like fruits, made an attractive show. Bidgee-Widgee was a constant annoyance, its brown balls of hooked seeds pertinaciously clinging to one's nether garments. Coast Beard-heath, *Leucopogon Richéi*, provided with its fruit an abundance of food for the birds. At Sealers' Cove, the vegetation under exceptional conditions for growth, is unusually vigorous. Specially noticeable were the very fine foliage and flowers of the Grass Trigger-plant, *Stylidium graminifolium*, with an unusual number of blooms, excellent in colouring, and of very robust habit. Its fine appearance would seem to promise distinct improvement if placed under expert cultivation as a garden plant. The Scented Fan-flower, *Scaevola suaveolens*, was exceptionally fine in leaf and flower. Another species of unusual size and attractiveness was the Forest Groundsel, *Senecio velleioides*, the Saw Groundsel, *S. vagus*, and the Scented Groundsel, *S. odoratus*, also showed similar characteristics. Of Orchids, a single specimen of the Hyacinth Orchid, *Dipodium punctatum*, and one of the Potato Orchid, *Gastrodia sesamoides*, were seen, the later a very fine plant two feet high with about twenty flowers on the stem. Most of the moisture-loving plants had passed the flowering stage, but *Viminaria denudata* still showed its golden sprays. The Banksias, of which four representatives grow at the Promontory, were much admired, and seem to have ideal conditions for growth. The Cushion-bush, *Calocephalus Brownii*, was in many places close to the sea, quite luxurious, as the accompanying illustration shows.

Every day was well occupied in the open, the variety of scenery by sea and shore, on the timbered ridges, in fern-clad gullies, by shaded mountain creeks, on the heathland, and over sandy, stony, gritty or carpeted, leaf-strewn tracks, in touch with nature, animate and inanimate, being a source of continual interest to us. In regard to the fauna, that which left the most lasting impression upon us was the Sandfly, *Ceratopogon molestes*, unobtrusive but effective in its operations. It was in its thousands near the Darby, and very aggressive. The accommodation at the Chalet was

very satisfactory, and the popularity of the National Park as a tourist resort is greatly increasing. Despite mosquitoes, March flies and sand-flies—minor discomforts—we had a very interesting and pleasant excursion. Owing to delay in definitely marking out a route, the construction of a road through the isthmus has not yet been taken in hand. Only a good road and increased accommodation are required to ensure the popularity of the National Park for visitors. Rest Houses are to be erected at Sealers' Cove, Titania Creek, and Oberon Bay. These will be of material advantage to campers. Tracks, generally, are good. Bad Saddle might to advantage be regraded. The planting of some quick-growing gums for shade and shelter near the Chalet would be an advantage, and relieve the bareness. A good boat on the Darby is badly needed. Members visiting the National Park can be assured of every attention to their needs, and riding and pack-horses are always available for long journeys.—Chas. Daley.

EXCURSION TO QUEEN'S PARK, MOONEE PONDS.

About a dozen members and others visited Queen's Park on Saturday, 17th January, in search of pond organisms. Although the material collected was fairly good, some interesting protozoa obtained on a previous visit were wanting on this occasion. The extensive lily-pond was the first scene of operations, and most of numerous forms noted were obtained there, protozoa being in the majority. A red Stentor, although doubtless *S. igneus*, differed considerably from the type as figured in Kent's "Manual," being much longer in proportion to its breadth. It was very numerous. Three species of the genus Trachelomonas were found, one bearing a remarkable resemblance to a floating bottle being specially interesting. This I take to be a very large form of *T. cylindica*, Ehr. It is seemingly generally to be had in this pond, although far from common. A small gathering of moss (Funaria) from near the water's edge yielded representatives of three genera of Rhizopoda and a large variety of diatoms. The large lake in the Park received attention next, and proved to be swarming with Entomostraca, a large form of *Daphnia carinata* being very plentiful. In this lake we were surprised to find a number of colonies of the free-swimming rotifer, *Lacinularia elliptica*, Shep., the water being practically devoid of vegetation. The Rhizopoda, *Difflugia lobostoma*, Leidy, was found in some sediment

taken from the bottom of the lily-pond. The weather being delightful, a very pleasant afternoon was spent.—J. Stickland.

EXCURSION TO OAKLEIGH GOLF LINKS.

An enjoyable time was spent at the Metropolitan Golf Links at Oakleigh by members who attended the excursion on the afternoon of Saturday, 31st January. The party was received by Mr. Shaw, the manager and secretary, who escorted the visitors round the grounds, and it was soon realised by them that the Golf Club was doing a great deal towards fostering the planting of Australian trees and shrubs. In all parts of the 166 acres these were to be seen, some being in bloom. The tree that attracted the most attention was the West Australian Crimson-flowering Gum, *Eucalyptus ficifolia*, many specimens of which were conspicuous among the native scrub. The glory of them all was to be seen in the splendid specimen in front of the Club House. This tree, which is thought to be the finest in Australia, is worth going a long way to see. It was not quite in full bloom, but members who saw it on that day can well believe that the beautiful coloured plate that appeared in the "Gum Tree" last year is a faithful representation of it as it would appear a fortnight later. All the local native plants outside the fairways and greens are protected, and, in spring, should present a fine show of bloom. A few were found still flowering, such as two of the Guinea-flowers, the Tufted Grass-Lily (*Stypandra*), the Golden Goodia, the Blue-spike Milkwort, and a few others. Mr. St. John directed the attention of the party to twenty-five species of Acacias and eight of Eucalypts, several of which were in bloom, viz.: *Acacia pruinosa*, *decurrens* var. *mollis*, *elata*, *rhetinodes*, *linearis*, *Eucalyptus ficifolia*, *calophylla* (both in various shades of colour), *botryoides* and the local *viminalis* and *ovata*. The fine avenue of *Cupressus macrocarpus* of North America, leading from the gate, and the beautiful *Carissa grandiflora* and *Virgilia capensis* were much admired. After the ramble, the members of the party were invited to afternoon tea, at which Mr. Shaw was accorded a hearty vote of thanks for his hospitality, on the motion of Messrs. C. Daley and F. Pitcher, both of whom congratulated the Club on the fine work it is doing in popularising the growth of Australian ornamental vegetation.—H. B. Williamson.

SOME VICTORIAN HOLIDAYS.

By A. L. SCOTT.

(Read before the Field Naturalists' Club of Victoria, 15th January, 1925)

The slides which I am about to show you to-night represent the cream of the photographs taken during the holidays of many years.

Early in 1923 a friend and myself agreed that for our next holidays we would attempt the walk across the Baw Baws, from Warburton to Walhalla. We were able to obtain simultaneous leave in December. Shortly before the date upon which we had arranged to start, we were informed by the tourist authorities that the track was in a bad condition, and were advised to wait for a month or so until repairs had been effected. We decided to risk it, but we took extra provisions in case of trouble. We thought we had arranged for a vehicle to take us the twenty miles between Warburton and McVeigh's, but it failed to materialise; however, we were given a lift for some miles in a motor by some Board of Works officials. They landed us at a "glue-pot" near the O'Shannassy works, and we humped our swags on to Walsh's Creek (McVeigh's).

Next day we followed the track up the Yarra valley, crossing Alderman's Creek, and lunching in a delightful spot alongside the clear waters of the Yarra some distance beyond Contention Creek, where a little mining was at one time carried on. Long years ago, before this track was opened up, I was one of a party that made an attempt to reach the Yarra Falls, and return to Melbourne during the four days of the Christmas holidays. We attempted then to follow ridges, but got into difficulties somewhere in the direction of Mount Horsfall. We were wise enough to abandon the attempt and return the way we had come, otherwise a rescue party might have been required.

We have the track now, and on this occasion reached the "Falls" but in nice time to get dried and have tea by the light of our fire. For we had experienced soaking rain for some miles, and the fern fronds had unladen some of the moisture they carried on to our clothing. Next day we visited the Falls, which are situated on Fall's Creek, some little distance from the Yarra, taking things easily in anticipation of trouble. There was a storm that night, but the morning broke fine, and we had no more rain until

after our return to Melbourne. The crossing at Fall's Creek is a lovely spot, but from there for some miles the track is a perfect switch-back. Looking back on that day's walk, I know we must have had considerable stretches of clear track, but I see it as a nightmare of steep uphill pinches and interminable scrambling over logs—logs of all sizes, sometimes almost too big to climb over, sometimes singly like the giant shown, sometimes in twos and threes or even fours and fives, sometimes like a giant's ill-made piece of corduroy. Neither of us are particularly young, and neither had been "on the wallaby" since before the war. Needless to say we were thankful to reach the Whitelaw hut in time to draw our water before dark.

This hut, as you will see by the slide, was decidedly ramshackle. So we decided if rain came on during the night we would shift our bedding to under the table. We had seen much beautiful forest scenery during the day. The crossing over the head waters of the Yarra was extremely beautiful, while at the Thompson bridge one had a strong feeling that there should be a country town within a mile or so. Probably its comparatively open situation, combined with the camping ground and a plentiful display of old Kodak cartons, caused this idea. At the Whitelaw hut (4800 ft.), we had a fine but cold night, and next day we found snow in places along the track. We made our lunch tea with melted snow, succeeded in crossing the swamps without much difficulty, and reached the Erica hut in good time. From there the panorama is magnificent and strongly reminded us of the views at Mt. Buffalo, the granite tors strengthening the resemblance. The magnificent forest-clad descent of Mount Erica marked the end of the interest of the trip. From there to the beautiful valley in which Walhalla lies there is little of interest but the signposts, which were often conspicuous by their absence. This is a defect which should be remedied. It cost us much heartburning and a couple of hour's delay, and doubtless other tourists have had similar experiences. Since our trip I understand the track has been greatly improved, and the huts replaced by new structures. Perhaps signposts have been put at each point where the timber tramway cuts the tourist track.

Another improvement which would be appreciated by visitors would be the erection of signposts at those picturesque creeks, not marked on the map in spite of their beauty, which are crossed between Contention Creek and

the Fall's hut. They should show the name of the Creek and the distances to Fall's Creek and McVeigh's respectively. The Tourist Bureau authorities are always willing to supply maps of any portion of the State for which they have been published, and to add any other information which they happen to possess.

Our southern coast contains scenery of quite a different character to what I have just shown. From Geelong to Koroit was covered by two trips, one, a lone hand, from Geelong to Lorne, and the other with "billy" and swag and a companion from Koroit to Lorne. I arrived at Geelong late one evening, having travelled nearly all day, tired and hungry. I slept the sleep of the just, and next morning sallied forth to see the queen city of Corio in a whirling dust storm, soon to be followed by heavy rain, which presently blew over and was followed by clear watery sunlight. Barwon Heads, at the end of the first stage of my journey, looked clean and attractive, the fishing boats at the mouth of the river making a pretty picture; but it seemed a deserted village. A solitary smoke led me to a store, where accommodation was enquired for. The hotel was suggested. "Is it not shut up for the season?" Oh, no, only like every place else, it has been shut up for the dust storm." Thither the traveller hastened, anticipating dinner and other comforts. The comforts were there all right, but no dinner, only tea.

Next day, along the coast towards Torquay was desolate in the extreme. Damp sand sizzled against one's leggings with a steady drone. Blank sea to the left and high sandhills to the right. Twice I essayed these, but the dismal spectacle of sand-buried fences and bleak lands, together with the annoyance of a dry sand blast in the face, drove me back to the luxury of the beach. To add to the cheerfulness of this uncheerful spin, there lay in one place the mast of a sizeable vessel, a ketch I think, and in another, the half of a fishing boat. At picturesque Torquay no warm dinner awaited me, only a common or garden tea. From the uplands beyond, on looking back, one has a splendid view of Port Phillip Heads and Cape Schanck, while a pleasant bush walk led me into Anglesea, shortly after the departure of the coach. I enquired for dinner. "Very sorry," said my hostess, "we only have lunch." However, that lunch was better than many meals served under the more ambitious title. After lunch my hostess directed me to the old coach road towards Lorne, and a section of that

walk sticks in my memory. The track was through a carpet of wild flowers, while the high ridge along which it ran commanded, on one side, a view of distant hills, and, on the other, the deep blue of the ocean, in which, to my mystification, sailed glorious purple patches. Later, I found that these were the reflections of the great wool-pack clouds sailing across the bright blue sky.

That night, at Anderson's, at Airey's Inlet, they showed me the Lonsdale and Schanck lights, forty miles away. The next afternoon I reached Lorne, and in the morning a guest of the house very kindly took me to the "Sanctuary" before breakfast, and I afterwards joined a picnic party and visited the Phantom Falls and other beauty spots before catching the coach for Dean's Marsh, and thence to town by train.

The following year our journey was from Koroit to Lorne so as to include Tower Hill. Near Nirranda we camped by a sea cliff. There was a handy waterhole and a broken fence. "We will show them at home how a tent should be pitched, and we will photo it to-morrow." Never put off, etc. Before midnight we had dressed again and packed our swags, and were sitting wondering whether the gale would carry our borrowed tent into the sea. When morning came it still stood. The fence had saved it, but we did not take that photo; it looked too disconsolate.

The views, you will notice, show some interesting examples of coastal weathering. How the joints in the rocks help the sea in its work of destruction, and how, in spite of the fury of the waves and their undermining action, there are places where the wind and rain are more destructive than the ocean. The coast hereabouts has been a graveyard for ships in the olden days. The story of the "Loch Ard" is well-known, but there were many others—the "Fiji," the "Marie Gabriel," the "Eric the Red," etc. Near Moonlight Head the tertiary coastal plains give way to the mesozoic of Lorne, with its rounded hills falling right down to the sea.

On the western side of the Otway the cliffs are grander and more forbidding than those of the famous watering place. Being unable to get the desired view of Moonlight Head in the camera with the ordinary lens, I fell back on that friend of our childhood days, the pin-hole, with some success, as you will notice. These beaches are very treacherous, and visitors would do well to make enquiries as to places of ascent and descent, and keep a look out for "king" waves. After wading the Aire River mid-thigh deep, we

picked up the track to the Otway lighthouse, threading our way through interminable sandhills. Here we got a friendly welcome, and, after seeing the sights, departed with some of the best bread in our packs we had ever tasted. We camped that night in the shelter of the tea-tree, and next day dined at Apollo Bay, reaching the Kennet River by nightfall. Between Rivernook and the Joanna, and again near Apollo Bay, we learned the real significance of the word "mud." Thence we went by the beach as far as the Cumberland River. Between the Jamieson Creek and the Cumberland the beach is under water at high tide. It is rough but picturesque, and well worth seeing, but visitors should be sure of the tides, and not venture there alone. From the Cumberland we took the track over the hillls into Lorne, where we spent another very interesting week.

With the hope that the Wandong district may prove interesting enough to provide an excursion locality for week-end trips, I give a few slides of an outing there, from which you can perhaps judge of its capabilities. With the addition of a camera to one's packages, nature lovers can add greatly to the interest of their holidays away from home, and bring back vivid recollections of many happy hours spent in mountain glen or by the sad sea waves.

[The author exhibited a fine series of lantern slides depicting scenes in different parts of the State. *Ed. Vic. Nat.*].

Life of Baron von Mueller.—The reprints of this article referred to in the last *Naturalist* have been delayed in the press, and will be forwarded to applicants as early as possible. Copies will be obtainable, as before stated, on receipt of one shilling; postage, one penny extra.

The Demand for Wood.—The president of the American Tree Association, Mr. C. L. Pack, speaking at Washington, U.S.A., recently, says that now is the time to interest people in timber growing, which must shortly become an important industry, as natural supplies are fast diminishing. The United States alone uses eight million tons of paper, made from wood pulp, yearly. This is a serious drain on its resources, and it has been calculated that the world uses 4,675,650,000,000 wooden matches yearly, for which £40,000,000 are paid. Some reader may have the patience to work out the weight of wood, in the matches used daily, as a change from the weariness of cross-word puzzles.

CHARLES J. GABRIEL
BEQUEST
Rec'd 29 Aug. 1963

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The Victorian Naturalist:

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OF
The Field Naturalists' Club of Victoria

Published 16th April, 1925

Hon. Editor: F. G. A. BARNARD, Esq.

The Author of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS--ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING.

MONDAY EVENING, 20th APRIL, 1925.

1. Correspondence and Reports.
2. Election of Members.

AS ORDINARY MEMBER—	PROPOSER.	SECONDER.
Mr. W. H. Callinder, 52 Alexandra Avenue, Canterbury.	Mr. J. W. Audas, F.L.S.	Mr. P. F. Morris.
Mr. — Dwyer, 38 Brougham Street, Box Hill.	Miss Hart.	Mr. J. Searle.
Mrs. Dwyer, 38 Brougham Street, Box Hill.	Miss Hart.	Mr. J. Searle.

3. Nominations for Membership.
4. General Business.
5. Remarks by Exhibitors relative to their Specimens.

   Ten minutes' adjournment for discussion of Exhibits.

6. Reading of Paper and Discussion thereon.

   1. By Mr. P. F. Morris—"The Need for Growing Softwoods for Paper-making."
   2. Holiday Notes, by Members.

   The Committee will be pleased to receive promises of papers for future meetings.

7. Reading of Natural History Notes.

   Members who may note any unusual ocurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same, that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

   Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Club year ends on 30th April. Any subscriptions overdue should be forwarded to the Hon. Treasurer **at once.**

Subscriptions for the year 1925-6, at the new rate, will become due on 1st May:—Ordinary Members, 20/-; Country Members, 12/6.

SPECIAL NOTICE.—The attention of members is directed to item 8 of business paper. Notices of exhibits should, if possible, be type-written.

NOTE. Owing to the second Monday falling on Easter Monday, the Monthly Meeting will be held on Monday, 20th April.

The Victorian Naturalist

Vol. XLI—No. 12. APRIL 16, 1925. No. 496.

FIELD NATURALISTS' CLUB OF VICTORIA.

A special meeting of the Club was held at the Royal Society's Hall on Monday, 9th March, 1925.

The President, Mr. J. Searle, occupied the chair, and about fifty members were present.

The Chairman stated that the meeting had been called by the Committee to consider proposed alterations to the rule relating to subscriptions.

Mr. G. Coghill moved: "That in Rule 4—subscriptions—the word 'fifteen' in clause (b), ordinary members, be altered to read 'twenty,' and if this be agreed to, consequent alterations be made in the rates of subscription for country members and associates." Seconded by Mr. F. G. A. Barnard.

Messrs. H. B. Williamson, C. Lambert and F. Pitcher supported the motion, which was carried unanimously.

Mr. G. Coghill moved: "That the subscription for country members be increased to twelve shillings and sixpence, and that clause (c) be altered accordingly." Seconded by Mr. H. B. Williamson and carried.

Mr. G. Coghill moved: "That the subscription for associate members remain as at present." Seconded by Mr. C. Oke, and carried.

The special meeting then closed.

ORDINARY MEETING.

CORRESPONDENCE.

The Chairman read a letter received by the Committee from the Hon. Editor, Mr. F. G. A. Barnard, tendering his resignation of the position, which he had held continuously for a period of thirty-two years, and stating that he would bring out the April number of the *Naturalist*, the concluding issue of the current volume.

The Chairman said that the resignation had been accepted by the committee with very great regret. Mr. Barnard's services had been of great value to the Club, and he trusted someone would come forward to fill the vacancy.

Dr. Sutton moved a hearty vote of thanks to Mr. Barnard for his long service, and congratulated him on the very fine

journal he had given to the Club for so many years. The motion was seconded by the Chairman, and carried unanimously.

Mr. Barnard responded, and thanked the members for their very kind appreciation of his work.

Mr. F. Pitcher moved: "That the Committee frame a suitable resolution expressing the Club's indebtedness to Mr. Barnard for his valuable services for so long a term; such resolution to be recorded in the minute-book of the Club." This was seconded by Mr. A. E. Rodda, and carried unanimously.

The Chairman said it would be necessary to appoint an Editor, whose duties would commence with the first number of the new volume May, 1925.

Dr. Sutton proposed that Mr. Chas. Barrett, C.M.Z.S., be Hon. Editor. Seconded by Mr. P. R. H. St. John. There being no other nomination, Mr. Barrett was declared duly elected.

Mr. Barrett returned thanks for the honour done him, and said that, with the help of the members, he hoped to be able to produce a satisfactory journal.

REPORT.

A report of the excursion to the Botanic Gardens on Saturday, 14th February, was given by the leader, Mr. P. R. H. St. John, who said that there was a large attendance of members. The afternoon had been devoted to an inspection of the various conifers in the Gardens. Of this group of trees there is a very fine representative collection, including, perhaps, the finest specimen of the New Zealand Kauri Pine to be found growing outside New Zealand. A short lecturette on the subject had been given explanatory of the trees seen.

A vote of thanks was passed to Mrs. St. John for her hospitality on the occasion.

PAPERS READ.

1. By Mr. C. Oke, entitled "New Australian Coleoptera" (Part I).

The author recorded as new a species of Aphodius belonging to the family Scarabidæ, and several Pselaphidæ belonging to the genera Sagola Rybaxis, Tmesiphorus, and Narcodes. He also proposed a new genus, Chalcotarsus, to include a species which cannot be placed in any existing tribe of the family defined by Raffray, consequently the name Chalcotarsini had been selected for a new tribe.

2. By Mr. C. D'Alton, entitled "Plants and Shrubs peculiar to the Grampians."

The paper was read by Mr. H. B. Williamson, in the absence of the author, who in a series of interesting notes mentioned the most important plants, which are found only in the Grampians.

Dr. Sutton, Messrs. H. B. Williamson, F. G. A. Barnard and J. Searle contributed to a short discussion on the paper.

EXHIBITS.

By Miss E. C. Cameron—Marine shells, *Venus lamellata*, from Bridport, Tas., and *Solen vaginoides*, from Brown's River, Tasmania.

By Mr. F. Chapman, A.L.S.—Flowers of *Grevillea asplenifolia*, grown at Balwyn. Plant purchased at Wildflower Exhibition, October, 1922.

By Miss C. C. Currie—Mounted specimen of Swift.

By Mr. V. Miller—Pod of Match-box Bean, *Entanda scandens*, from Queensland, about 18 inches long; aboriginal stone axe; quartzite from Devon, England.

By Mr. C. Oke—Twenty specimens of Beetle, *Stigmodera variabilis*, Don, showing remarkable variations as to colour, markings and size.

By Mr. A. E. Rodda—Specimen showing attachment of young Mistletoe plant, Loranthus sp., to end of a small branch of a Eucalypt.

After the usual conversazione the meeting terminated.

EDITORIAL.

With this number of the *Naturalist* I relinquish, with some regret, my post as Editor. During the long years I have followed the varying fortunes of our publication I have derived much pleasure from my association with it, and have made many lasting friends, and possibly some enemies, whom I know not. The duties of the position have become more exacting as the years passed, and, not being a man of leisure, there seemed to be no other alternative than to ask some one else to take up the reins; after a long run like this a change also is likely to be of advantage. I trust my successor will receive the support which such a position demands, and that it may be many years before the final issue of our Club's journal is printed.—F. G. A. Barnard.

THE SCIENTIFIC NAME OF OUR CLUB'S BADGE.

The name of the shell adopted some years ago as the badge of the Field Naturalists' Club of Victoria has long been known as Nassa fasciata, the Banded Nassa. This name seemed so appropriate that we feel we would like to retain it. But this the priority critics will not allow. And quite a storm in the nomenclatorial tea-cup has lately raged over the innocent little shell.

As far back as 1799 similar generic forms to ours were named Nassa by Lamarck; but Bolten, only one year before Lamarck (1798), named another shell, not congeneric, as Nassa. Therefore, a later generic name to fit our species has to be sought. This later name is found in Dumeril's Nassarius, 1806, and this, therefore, satisfies the demands of priority.

The controversy, however, does not end here, for the Nassa of Lamarck included a section, Alectrion, made later by Montfort (1810), to denote similar forms to the above; but this has been regarded by most authors merely as a subgeneric name. Unfortunately other authors desire to place our southern forms in Alectrion as a genus rather than in Nassarius. Hedley, Gatliff and Gabriel, however, uphold Nassarius.

As regards the trivial name, "fasciata" (i.e., banded), this also cannot be retained under priority rules. The original reference is to Lamarck's "Buccinum fasciatum" (1822). But here comes the difficulty; O. F. Müller (1774) had already described a different mollusc as "Buccinum fasciatum," which interesting but disturbing fact is pointed out by Iredale (Trans. N.Z. Inst., Vol. XLVII, 1915, p. 467). Iredale therefore proposes "victorianus" as a new name, and remarks, *loc. cit.*, under "Alectrion victorianus, nom. nov." "I believe this shell is the badge of the Field Naturalists' Club of Victoria, and for this reason have formed the above specific name."

After duly considering the claims of other authorities, the present writer cannot see from the above evidence any valid reason why our well-known shell should not be referred to as Nassarius victorianus, Iredale sp.—Fredk. Chapman.

THIRTY YEARS' ORCHID COLLECTING.

Paper I.

ORCHIDS OF THE HILLS AND MOUNTAINS.

By E. E. Pescott, F.L.S., and C. French, Jnr.

[*Introductory Note.*—No keener collectors of orchids have been known in this State than the two French's—father and son. When travelling facilities were rare, they walked for miles in different parts of the State, and were well-known as authorities on this family of plants. They would take the train to Box Hill, walk out through Ringwood, Belgrave and the Dandenongs in search of these flowers. No walk was too far for them when in quest of orchids. C. French, Senr., recorded his observations in the "Southern Science Record," and in the early volumes of the "Victorian Naturalist," forty years ago. He was the first to cultivate these orchids, and had a fine collection growing in pots in the Melbourne Botanic Gardens, where he was employed in those days. C. French, Jun., is known more for his collections and records, his first paper being a record of collections, published in 1895.—E.E.P.]

The rapid expansion of the suburbs of Melbourne, the modern facilities for quick transit, and the extension of homes to the mountain areas, are factors in the difficulty of orchid collecting in these modern times. In the days of collecting of C. French, Senr., orchids were collected in the Botanic Gardens domain and in Caulfield racecourse; Richmond, Hawthorn, Kew, Elsternwick, Caulfield and Brighton yielded their treasures also. Now these districts are thickly populated, and easily-reached localities no longer exist.

The difficulties connected with early orchid collecting included the difficulty of nomenclature. No real authority existed here, and local botanists were more interested in the conspicuous and hardier types of plants. Thus it is not surprising to find that *Pterostylis Toveyana* was collected by C. French, Senr., at "Gypsy Village," now Cheltenham, in 1887, but was not recognised as new, being classed as *P. reflexa*. Also, *Corysanthes bicalcarata* was collected by us at Healesville many years ago, and was named, by authority, as *C. pruinosa*. In 1892, C. French, Jnr., collected, on the Baw Baws, a *Caladenia*, which was named as a mountain variety of *C. carnea*. Now this flower has been re-collected on the same mountains, and is to be given specific rank.

This paper notes the orchids collected in a series of districts, more or less hilly, extending from Box Hill, through Blackburn and Ringwood, including Warrandyte, to the Dandenong Ranges; and then through Croydon to Warburton and Healesville. In the table attached localities are

given, with the name as a centre of a large radius; thus Ringwood would include Mitcham, and so on.

During the years under review we have collected, in these districts, 95 species out of the 135 species recorded for the State. Mueller's "Key" records 73 species, and of the many species since added to the list, quite a number of these have been listed as a result of our activities. This 95 species does not include varieties; many colour and other varieties have been so collected. Our best "bag" was taken a few years ago at Ringwood, when we collected 25 species in full flower, several other species being noted in foliage as well. This locality is now being sub-divided for country homes.

SARCOCHILUS.—The one local species of this epiphytic genus, *S. parviflorus*, is still to be collected at Fern Tree Gully, Bayswater and Belgrave. In one gully, about six years ago, we saw a Blackwood tree carrying, in September, nearly one hundred flower spikes. This year (1925) we collected five plants in full flower, early in January, in a Belgrave gully. It would seem as if, in the cooler gullies, the flowering season is much later than those facing north or west. This species is not at all particular as to its host. We have collected it here on Blackwood, Musk, Sassafras, Pittosporum, Blanket-leaf and Eucalyptus.

DIPODIUM and GASTRODIA.—Observations extending over several years lead us to conclude that these fleshy-rooted, leafless species do not flower for some time after gathering. A fine healthy spike of *Gastrodia sesamoides* was collected in 1923. In 1924 and 1925 the spot was revisited, but no flowering growth was noted. This orchid, like *Sarcochilus parviflorus*, flowers late in cool areas; it is to be collected in Sherbrooke Gully in January, while it is an October to November flower in warmer spots.

CRYPTOSTYLIS and SPIRANTHES.—These fleshy-rooted, leafy orchids are becoming rare. *Cryptostylis leptochila* was known at Belgrave, and always yielded a few flowers annually; but this year the Roads Board graded the road and deposited the clay on top of our patch. Thus it is lost for all time. Similarly our locality at Woori Yallock, which yielded a hundred spikes of *Spiranthes australis* a few years ago, has become a stock paddock, and our orchids are gone.

PRASOPHYLLUM.—This genus yielded us that species rare at any time, *P. flavum*, at Belgrave. Its yellow flowers, conspicuous in New Year, are easily seen; but it has only been recorded half a dozen times for Victoria.

We could never forget the day when we found two new species at Ringwood, growing in the same paddock—one green and the other with a large white labellum. The white

one was determined as *P. odoratum*, var *album*, new for Victoria; and the green one was new to science (see Fig. 4). At our request, Dr. R. S. Rogers named this *P. Brainei*, in honour of Mr. A. B. Braine, who had done us a similar honour a few years previously.

On the same day a fine clump of six stems of *P. Frenchii* was discovered, new for this district. This was a notable day, for we also found *Acianthus caudatus* (see Fig. 3) in the same locality; this orchid never having been recorded nearer to Melbourne than Healesville, where it grew abundantly.

Prasophyllum alpinum was collected many years ago in various localities. This species is sometimes united by botanists with *P. fuscum*. In "Flora Australiensis," Bentham remarks that *P. fuscum* has free sepals, though other botanists differ. He also repeats Gunn's observation, that *P. fuscum* is inodorous, while *P. alpinum* is strongly fragrant. Here, we find that *P. fuscum* is always sweetly fragrant.

Thelymitra.—On the day previously mentioned we also collected *Thelymitra pauciflora*, which has a new record for this State. A week later we found this "new" species at Cheltenham, Ringwood, and indeed many of the lower localities from Box Hill onwards, are abundant in Thelymitras, the more abundant species being *T. aristata*, *T. antennifera*, *T. flexuosa*, *T. carnea*, *T. ixioides* and *T. longifolia*. On a few occasions *T. grandiflora* has been found.

Microtis.—For years only two species of this genus were found here *M. porrifolia* and *M. atrata*. Later, *M. parviflora* was added. For years a Microtis was very abundant in several localities, which was labelled as *M. porrifolia*. Recently its variation was noted, and was named *M. oblonga*, on account of the shape of the labellum.

The periodic disappearance of orchids is often a matter for comment. In December, 1923, we observed *M. oblonga* by thousands, of all heights—some two or three inches tall, others nearly two feet—for miles along one of the tracks to Sherbrooke Falls. In the Belgrave district, too, that orchid was quite common during the same season.

These localities were visited in the next season, December, 1924, when it was found that this species was exceedingly rare, only a few scattered plants being found.

In the Sherbrooke Gully, in January last, an unusual orchid was observed growing upon a tree fern, about eight feet from the ground. There were two plants. Another plant was observed in a similar position, on a fern, about half a mile away from the others. The three plants were

growing on the western side of the ferns. It took some time to determine that they were either *Prasophyllum* or *Microtis*, as they were not in flower. They were probably *Microtis oblonga*, as that species is common on the hillsides of the gully, facing the ferns, and they were probably the produce of seeds which may have been blown over by the wind. This is one of the rare occasions that we can definitely assume the growth of orchids from seed, and we think it is the first record of a *Microtis* being an epiphyte.

CORYSANTHES.—This genus has yielded us four species, two of which are commonly epiphytes. *Corysanthes pruinosa* and *C. fimbriata* are often found on tree ferns in the gullies. They possess, along with *Chiloglottis*, the peculiar property of prolonging the flower stem (peduncle) after flowering. At the flowering stage, the flower stems of these orchids are usually not one inch in length. After fertilisation, the flower stem begins to elongate, and the capsule increases in size. Before the capsule dehisces and scatters the seed, the stems are frequently nine or ten inches in length. Nature has possibly given the plants this gift, in order that the seed may be scattered far and wide, as the seed capsule sways in the wind.

C. bicalcarata was collected at the Blacks' Spur; and an exciting "catch" was made at Fernshawe, when *C. unguiculata* was found in 1897, an interesting record of this species being found in a mountain area.

CALADENIA.—This genus provides us with some interesting recollections. One has previously been referred to in regard to *Caladenia Cairnsiana*. (See Vict. Nat., Vol. 37, p. 108.)

Many years ago, Baron von Mueller proposed to combine many forms, including *Caladenia Patersoni*, into one species, to be called *C. pulcherrima*. Thus, the species now known as *C. clavigera* was included in this group, subsequently being grouped with *C. Patersoni*. It has since been restored to specific rank. This species we have often collected in the hill country. This is also the case with *C. reticulata*. This species we collected fifteen years ago at Evelyn, as one of the varieties of *C. Patersoni*. It was found last year at Belgrave.

Caladenia alba is one of the rarities, and is referred to in the above-mentioned paper.

CHILOGLOTTIS.—The hill species of this genus are interesting as being both epiphitic and terrestrial. *C. Gunnii* is usually terrestrial, and *C. Mudleri* epiphytic. Occasionally the former is found growing on tree ferns; the latter has always been known as epiphytic until January, 1925, when we found two large colonies growing as terrestrial at the head of Sherbrooke Gully. These two species have the property of

Fig. 1 —LONG TONGUE GREENHOOD, *Pterostylis grandiflora*, R.Br.

Fig. 2.- RED TONGUE GREENHOOD, *Pterostylis decurva*, Rogers.
(Negatives by E. E. Pescott)

Fig. 3.—MAYFLY ORCHID, *Acianthus caudatus*, R.Br.
(Negatives by E. E. Pescott)

Fig. 4.—GREEN LEEK ORCHID, *Prasophyllum Brainei*, Rogers, and SWEET LEEK ORCHID (var.), *Prasophyllum odoratum* var. *album*, Rogers.

prolongation of the leaf stems, but usually only when growing on tree ferns. In the two large terrestrial colonies of *C. Mackeri* found this year, not one of the fruiting specimens made any attempt to increase the length of its stem. *C. diphylla* (*reflexa*) was found at Fernshawe many years ago.

For years we collected *Diuris palachila* as a yellow form of *D. maculata*. Subsequently it was found to be another species

Pterostylis.—This wonderful genus has provided us with many changes and surprises. Many years ago, *P. cucullata* was found and named. Then it was lost. In later years a tall, large-flowered orchid was collected, which the Baron named as *P. cucullata*, but which was really a new species. After this, the true *P. cucullata* was again collected, but not recognised: so the Baron named it *P. MacKibbini*—a second name for the one plant. Meantime Mr. C. French, Jnr., collected in the ranges a slender, smaller-flowered species, which the Baron named *P. cucullata*, var. *Alpina*.

It took years to find someone who would unravel the obvious tangle. Subsequently Dr. Rogers restored *P. MacKibbini* as *P. cucullata*. The usurping species was named *P. falcata*, and its alpine form, *P. alpina*. At Healesville, on the spot where the new reservoir is being built, we could always rely on getting one or two blooms each season; but a few years ago we were astonished to find a spot on Dandenong Creek where hundreds were in full flower. One albino plant was noted.

Another "find" was the astonishing appearance of *P. villata* at Healesville. This is purely a coastal form, and is rarely found in the hill country.

Another surprise was the finding at Belgrave of *P. grandiflora* (see Fig. 1), a species that had been "lost" for years. The beautiful *P. decurva* is one of the latest new species (see Fig. 2). Its dainty, slender form, combined with the delicate colour and rich red tongue, make it a much-desired flower. Mr. Alister Burns first directed our attention to this species, having seen it at Fern Tree Gully. It was missed for years on account of its late flowering season, being at its best in December and January.

The table following indicates the localities in which we have collected these and other orchids. We make an earnest appeal to orchid collectors and lovers not to unduly gather the flowers. They are fragile plants, and are fast disappearing. We should consider them as an heritage, rather than as a personal gift, doing all we can to protect them and pass them on to others in years to come.

ABBREVIATIONS OF LOCALITIES

Bayswater—Bays.	Croydon—Croy.
Belgrave—Bel.	Dandenong Ranges—Dand R.
Black Spur—B. Spur.	Evelyn—Ev.
Box Hill—B.H.	Fernshawe—Fern.

	Scientific Name.	Common Name
1	Sarcochilus parviflorus (Lindl.)	Small Sarcochilus
2	Dipodium punctatum (R.Br.)	Hyacinth Orchid
3	Gastrodia sesamoides (R.Br.)	Potato Orchid
4	Prasophyllum Archeri (Hk.f.)	Archer Leek-orchid
5	,, Brainei (Rogers)	Green-lipped Orchid
6	,, brevilabre (Hk.fil)	Short-lipped Orchid
7	,, despectans (Hk.f.)	Tiny Leek-orchid
8	,, flavum (R.Br.)	Yellow Leek-orchid
9	,, fuscum (R.Br.)	Tawny Leek-orchid
10	,, Frenchii (Fv.M.)	Stout Leek-orchid
11	,, nigricans, (R.Br.)	Dark Leek-orchid
12	,, odoratum (Rogers)	Sweet Leek-orchid
13	,, patens (R.Br.)	Pale Leek-orchid
14	,, intricatum (C.Stuart)	Elfin Leek-orchid
15	,, austrate (R.Br.)	Austral Leek-orchid
16	,, elatum (R.Br.)	Tall Leek-orchid
17	,, alpinum (R.Br.)	Alpine Leek-orchid
18	Calochilus campestris (R.Br.)	Peaked Beard-orchid
19	,, Robertsoni (Bth.)	Brown-beards
20	Thelymitra aristata (Lindl.)	Scented Sun-orchid
21	,, antennifera (Hk.f.)	Rabbit-ears
22	,, carnea (R.Br.)	Pink Sun-orchid
23	,, flexuosa (Endl.)	Twisted Sun-orchid
24	,, grandiflora (Fitz.)	Great Sun-orchid
25	,, ixioides (Sw.)	Dotted Sun-orchid
26	,, longifolia (R. and G. Forster)	Common Sun-orchid
27	,, Macmillani (Fv.M.)	Salmon Sun-orchid
28	,, pauciflora (R.Br.)	Slender Sun-orchid
29	,, canaliculata (R.Br.)	Pale Sun-orchid
30	Microtis porrifolia (R.Br.)	Common Leek-orchid
31	,, atrata (Lindl.)	Swamp Leek-orchid
32	,, parviflora (R.Br.)	Slender Leek-orchid
33	,, oblonga (Rogers)	Broad-tongue Leek-orchid
34	Caleana major (R.Br.)	Large Duck-orchid
35	Corysanthes pruinosa (R.Cunn.)	Large Helmet-orchid
36	,, bicalcarata (R.Br.)	Spurred Helmet-orchid
37	,, fimbriata (R.Br.)	Fringed Helmet-orchid
38	,, unguiculata (R.Br.)	Small Helmet-orchid
39	Acianthus exsertus (R.Br.)	Mosquito Orchid
40	,, caudatus (R.Br.)	Mayfly Orchid
41	Cyrtostylis reniformis (R.Br.)	Gnat Orchid
42	Lyperanthus suaveolens (R.Br.)	Brown-beaks
43	Eriochilus autumnalis (R.Br.)	Parson's Bands

Abbreviations of Localities

Fern Tree Gully—F.T. Gully	Wandin—Wand.
Healesville—Heal.	Warburton—Warb.
Mooroolbark—Moorol.	Warrandyte—Warr.
Ringwood—Ring.	Woori Yallock—Woori Yal.

Localities.

1 Dand. Rges., Bel., F.T. Gully, B. Spur, Bays.
2 B.H., Croy., Heal., Ring., Dand. R., Warr., Ev. Wand.
3 B.H., Croy., Heal., Bays., Ring., Dand. R., Warr., Wand. Fern.
4 Ring., Croy., Heal., Warb., Warr.
5 Ring., Bays.
6 Heal.
7 Ring., Bays., Heal., Croy., Warr., Dand. R.
8 Bel.
9 Bel., Ring., Warb., Heal., Dand. R., Warr.
10 Bays., Ring.
11 Bays., Ring., Croy., Heal., Warr.
12 Bays., Ring., Croy., Heal.
13 Bays., Ring., Croy., Heal., Fern., Dand. R., Warr.
14 Bays., Ring., Croy., Heal., Warr.
15 Heal.
16 Ring.
17 Ring., Dand. R.
18 Box Hill, Croy., Bays., Ring., F.T. Gully, Bel., Heal., Fern.
19 Box Hill, Croy., Bays., Ring., F.T. Gully, Bel., Heal., Fern., Dand. R., Warr.
20 B.H., Croy., Ring., Heal., Warb., Warr., Fern.
21 Ring., Bays., Mitcham, Warr., Heal.
22 Ring., Bays., Croy., Heal., Warr.
23 Ring., Bays., Croy., Heal., Warr.
24 Ring.
25 Ring., Bays., Croy., Heal., Warr., Fern.
26 Ring., Bays., Croy., Heal., Warr.

27 Ring., Warr.
28 Ring., F.T. Gully.
29 Ring., Bays.
30 All districts.
31 All districts.
32 Ring., Heal.
33 Heal., Dand. R.
34 Ring., Heal.
35 Ring., Heal. Fern., and Fern Gullies.
36 Fern., Heal.
37 Fern Gullies.
38 Heal., Fern.
39 Ring., Heal., Warr., Fern.
40 Ring., Heal., Warb., Fern.
41 Ring., Heal., Ranges.
42 Ring., Warr., Bel.
43 All districts.

	Scientific Name.	Common Name
44	Caladenia alba (R.Br.)	White Caladenia
45	,, cucullata (Fitz.)	Hooded Caladenia
46	,, congesta (R.Br.)	Black-tongue Caladenia
47	,, cœrulea (R.Br.)	Blue Caladenia
48	,, cordiformis (Rogers)	Small Spider-orchid
49	,, carnea (R.Br.)	Pink Fingers
50	,, deformis (R.Br.)	Blue Fairies
51	,, dilatata (R.Br.)	Fringed Spider-orchid
52	,, latifolia (R.Br.)	Pink Fairies
53	,, Menziesii (R.Br.)	Hare Orchid
54	,, Patersoni (R.Br.)	Common Spider-orchid
55	,, testacea (R.Br.)	Musky Caladenia
56	,, clavigera (A.Cunn.)	Clubbed Spider-orchid
57	,, reticulata (Fitz.)	Veined Caladenia
58	Chiloglottis reflexa (Cheel.)	Autumn Bird-orchid
59	,, Gunni (Lindley)	Common Bird-orchid
60	,, Muelleri (Fitz.)	Green Bird-orchid
61	Glossodia major (R.Br.)	Wax-lip Orchid
62	Diuris alba (R.Br.)	White Diuris
63	,, punctata (Sm.)	Purple Diuris
64	,, palustris (Lindl.)	Swamp Diuris
65	,, maculata (Sm.)	Leopard Orchid
66	,, palachila (Rogers)	Broad-lip Diuris
67	,, pedunculata (R.Br.)	Snake Orchid
68	,, sulphurea (R.Br.)	Tiger Orchid
69	,, longifolia (R.Br.)	Tall Diuris
70	Orthoceras strictum (R.Br.)	Horned Orchid
71	Cryptostylis leptochila (F.vM.)	Small Tongue-orchid
72	,, longifolia (R.Br.)	Large Tongue-orchid
73	Spiranthes australis (Lindl.)	Austral Lady's-Tresses
74	Pterostylis alpina (Rogers)	Alpine Greenhood
75	,, acuminata (R.Br.)	Pointed Greenhood
76	,, barbata (Lindl.)	Bearded Greenhood
77	,, concinna (R.Br.)	Trim Greenhood
78	,, curta (R.Br.)	Blunt Greenhood
79	,, alata (Reich.)	Purplish Greenhood
80	,, decurva (Rogers)	Red-tongue Greenhood
81	,, falcata (Rogers)	Sickle Greenhood
82	,, longifolia (R.Br.)	Tall Greenhood
83	,, Mitchelli (Lindl.)	Mitchell Greenhood
84	,, nutans (R.Br.)	Nodding Greenhood
85	,, nana (R.Br.)	Dwarf Greenhood
86	,, obtusa (R.Br.)	Blunt-tongue Greenhood
87	,, pedunculata (R.Br.)	Maroon-hood
88	,, parviflora (R.Br.)	Tiny Greenhood
89	,, rufa (R.Br.)	Rusty-hood
90	,, grandiflora (R.Br.)	Long-tongue Greenhood
91	,, vittata (Lindl.)	Banded Greenhood
92	,, furcata (Lindl.)	Forked Greenhood
93	,, pusilla (Rogers)	Ruddy-hood
94	,, reflexa (R.Br.)	Striped Greenhood
95	,, revoluta (R.Br.)	Autumn Greenhood

Localities.

44 Near Croy.
45 Dand. R., Heal.
46 Ring., Croy., Heal., Bays., Ranges.
47 Warr.
48 Ring., Heal., Fern.
49 All districts.
50 Ring., Croy., Heal., Warb.
51 All districts.
52 Ring., Bel.
53 Ring., Moorool., Warb., Heal., Bel., Wand., Ev., Dand. R., Fern.
54 All districts.
55 Ring., Moorool, Croy., Heal., B.H., All districts.
56 Bays., Bel.
57 Bel.
58 Ring., Heal., Fern.
59 Ring., Heal., Bel., Dand. R., B.H., Warr., Fern.
60 Heal., Bel., Emerald, Gemb., B. Spur.
61 All districts.
62 Croy.
63 Ring., Heal., Moorool, B.H.
64 Ring., Croy., Warr., Woori Yall.
65 All districts.
66 F.T. Gully.
67 All districts.
68 B.H., Croy., Heal., Warb., Heal., Warr.
69 All districts.
70 Ring., Bays.
71 Dand. R., Bel., Gemb., Emerald, F.T. Gully.
72 All districts.
73 Yarra Glen, Woori Yall., Heal.
74 Dand. R., Heal., Ring., B. Spur, Emerald, Aura, Fern.
75 Heal., Steele's Ck.
76 Ring., Warr., Bays.
77 Ring.
78 Ring., Warr., Heal., Dand. R., Fern., B.H.
79 F.T. Gully.
80 Bel., F.T. Gully, Ring.
81 Ring., Heal., Warr., Lil., Bays., Warr., Fern., Dand. R.
82 All districts.
83 Warr.
84 All districts.
85 Ring.
86 Warr., F.T. Gully.
87 Ring., Heal., Bay., Croy., Warb.
88 All districts.
89 Warr., Warb., Dand. R.
90 Bel.

91 Heal.
92 Aura.
93 Box Hill to Bays.
94 Ring., F.T. Gully.
95 Ring., Bays.

[The paper was illustrated by lantern slides, depicting many of the above species.—Ed. *Vict. Nat.*]

"THE TRANS-AUSTRALIAN WONDERLAND."—Some months ago, June, 1924, a notice appeared in these pages of the first edition of Mr. A. C. Bolam's booklet dealing with the natural history of the Ooldea district, and it must be very gratifying to the author that he has been compelled, by the demand for his little volume, to issue a third and enlarged edition. The present volume extends to one hundred and ten pages, and is cloth bound, so that it is a worth-while addition to one's bookshelf. We congratulate Mr. Bolam on the interest he has created in this out-of-the-way, but interesting, district. The Ooldea district, situated on the Trans-Continental line just on the eastern edge of the great Nullabor plain, some 427 miles west of Port Augusta, and politically still in South Australia, has been fortunate in having had such a man stationed within its boundaries, and the world is the gainer by the fact that Mr. Bolam had enough interest in what he saw to put his observations into writing, and afterwards into print. Such actions deserve commendation whenever met with, and no matter how trifling, add to the gradual accumulation of human knowledge. From the illustrations one would not think that such fascinating notes could be gathered together, and the author deserves all the more credit for his success, for it must be remembered that such notes can only be result of years of observation and study. Another fact which adds to the wonder of the story is the absence of water in the district, for no such thing as a stream or lagoon exists for hundreds of miles in any direction. The rainfall is less than ten inches per annum, and disappears into the soil directly it falls. At certain places there are "soaks," where water can be got by those who know how, but where do the birds and animals of the district derive the moisture they require to keep body and soul together? The climate is naturally dry, with cool nights, and is not difficult to bear. Owing to the radiation of heat being so rapid, and the absence of clouds and other causes detrimental to the formation of dew, the air at night remains calm, saturation takes place quickly and dew is precipitated. The vegetation, such as saltbush, bluebush, etc., absorbs dew quickly, and thus gets its necessary moisture as much from the air as from the ground. The animals of the district, in like manner, utilise the dew by licking it off the leaves of the plants and shrubs. Considerable space is given to remarks on the aboriginals, and the author remarks on wonderful powers of vision they

possess. No white man, not even an old sea captain, he says, can approach a black in keenness of sight. A native can see the smoke of a locomotive forty-five miles away; this is partly due to the extreme clearness of the atmosphere, more pronounced at certain seasons of the year. The book is well illustrated, and nature-lovers will find in it a mine of interesting information.

THE DIPROTODON.—Many parts of the world have furnished remains of gigantic animals which once inhabited that particular region, and not to be behindhand in that respect, Australia has supplied the world with remains of the Diprotodon, the largest marsupial known to have existed. The *Australian Museum Magazine* for October last reproduces a photograph of a group of Diprotodons recently set up in the American Museum of Natural History, in New York. The animals, in their restored form, look like huge wombats. It is more than ninety years since the first fragments of the bones of these gigantic animals were found in the Wellington Caves, New South Wales. At that time scientists were in doubt as to the actual shape of the animal, but all doubts were set at rest some few years ago by the finding of a wonderful deposit of Diprotodon remains at Lake Callabonna, in South Australia, about 600 miles north of Adelaide. These were embedded in the mud of a salt lagoon about three feet below the surface. Hundreds of more or less complete skeletons were dug out under the supervision of the late Professor Stirling, Director of the South Australian Museum. It is supposed that the animals became bogged in the soft mud, probably when seeking water during a dry season. From the bones found, which included those of the feet, which had hitherto been missing, this last find enabled a complete skeleton to be set up, and the animal restored to something like its original appearance. Casts were sent to various museums, hence the group in the New York institution. The name Diprotodon is derived from the fact that the animal was remarkable for its front teeth, and the discovery of food remains at Callabonna shows that it lived on saltbush and other shrubs resembling those growing in the district to-day. Remains of the Diprotodon have been found in other States, but nowhere in such quantity as at Lake Callabonna.

CORRECTIONS.—The following corrections should be made in the article "Around Noojee" in the January *Naturalist*:

Page 168 line 4 from bottom — For "*stipoides*" read "*juncea.*"
" 170 " 20—For "*uniformis*" read "*reniformis.*"
" 170 " 16 from bottom — For "*Leycesitra*" read "*Leycesteria.*"
" 172 " 10—For "*P. Lawrenciana*" read "*C. Lawrenciana.*"
" 173 " 14 from bottom — For "*ferugineum*" read "*ferrugineum.*"
" 173 " 12 from bottom — For "heteraphylly" read "heterophylly."
" 176 " 22—For "Pattersonii" read "Patersonii."
" 176 " 25—For "Lanceolatum" read "lanceolatum."
" 176 " 35—For "grammitidis" read "gramitidis."
" 176 " 37—For "circinnata" read "circinata."
" 176 " 7 from bottom—For LYCOPODINACEÆ" read "PSILOTACEÆ."
" 177 " 3—For "Juncea" read "juncea."
" 177 " 10—For "F.V.M." read "F.v.M.," also in other places.
" 177 " 17—For "GLYPERACEÆ" read "CYPERACEÆ."
" 177 " 7 from bottom—For "bufenius" read "bufonius."
" 178 " 9—For "Chorysanthes" read "Corysanthes."
" 179 " 2—For "Stonecap" read "Stonecrop."
" 179 " 15 For "sanquisorbæ" read "sanguisorbæ."
" 180 " 4 from bottom — For "HALORAGEÆ" read "HALORRHAGIDACEÆ."
" 180 " 3 from bottom — For "Haloragis" read "Halorrhagis."
" 182 " 15 from bottom — For "Clearia" read "Olearia."
" 182 " 12-14 from bottom—For "C." read "O."
" 183 " 6—For "velleoides" read "velleioides."
" 183 " 16 from bottom—For "Leycestria" read "Leycesteria."
" 183 " 11 from bottom—For "Golden Crown Grass" read "Silt Grass."

NOTE.—In many cases hyphens have been inserted in the wrong places, e.g., page 182, "Musk-Daisy Bush" should read "Musk Daisy-bush."

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